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**PRESERVATION OF
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ΕΛΛΗΝΙΚΗ
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ΕΤΑΙΡΕΙΑ
ΕΔΑΦΟΜΗΧΑΝΙΚΗΣ
& ΓΕΩΤΕΧΝΙΚΗΣ
ΜΗΧΑΝΙΚΗΣ

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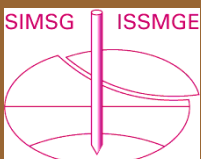
GeoCartoon



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Π Ε Ρ Ι Ε Χ Ο Μ Ε Ν Α

Άρθρα	4	Solmax Case study: NJDOT utilizes GEOTUBE dewatering containers to restore channels to navigable depths	19
- Coire Glas Exploratory Works: Building Understanding	4	Call for Bids: Hosting the GeoEng 2030 Conference	19
- DIGGS Version 3.0 Released: Enhanced Capabilities for Geotechnical Data Exchange	12	IGS Foundation Supercharges Fundraising Strategy With Key Appointment	19
Νέα από τις Ελληνικές και Διεθνείς Γεωτεχνικές Ενώσεις	14	Did You Know? Geosynthetics make significant contributions to the UN Sustainable Development Goals	19
- Ελληνική Επιστημονική Εταιρεία Εδαφομηχανικής και Γεωτεχνικής Μηχανικής	14	Did You Know? Geosynthetics can reduce the use of aggregates in infrastructure construction by 50% and up to 90% in some cases	19
10ο Πανελλήνιο Συνέδριο Γεωτεχνικής Μηχανικής Ξάνθη, Οκτώβριος 2027	14	Learn How to Attract Diverse Talent at the 13ICG Session	19
Προκήρυξη Διαγωνισμού: Επετειακό Λογότυπο για τα 60 Χρόνια της ΕΕΕΕΓΜ (1966–2026)	14	Did You Know? Geosynthetics help protect the environment from landfill waste contamination?	19
- International Society for Soil Mechanics and Geotechnical Engineering	16	13ICG Machine Learning Course Just \$50 For IGS Young Members	19
ISSMGE News	16	- British Geotechnical Association	20
ISSMGE Interactive Technical Talk Episode 30: Ground Improvement (TC211)	16	News	20
50 Years of the Bolivian Geotechnical Engineering Association (ABIG)	16	Marina Schnaider Bortolotto Wins 57th Cooling Prize Competition	20
The Countdown to AYGEC'26 Has Begun – Just 34 Days to Go	16	The April 2026 issue of Ground Engineering is available online	20
Opening of ICSE-13 website	17	WiGeotech 2026: A Landmark Celebration of Inclusion and Inspiration in Geotechnics	20
ISSMGE Lifetime Achievement Medal - Last Call for the 2026 Nominations	17	BGA Supports GE Sustainability & Resilience 2026	20
- International Society for Soil Mechanics and Geotechnical Engineering - ISSMGE Europe	17	Call for Nominations for the BGA Executive Committee 2026	20
Four years in review: the European Council Report for Vienna 2026	17	BGA Supports Inspiring Women in Construction and Engineering 2026	20
ICSMGE 2026	17	State of the Industry: Ground Investigation- Survey	20
- International Society for Rock Mechanics and Rock Engineering	17	Professor Charles Ng announced as 65th Rankine Lecturer	20
News	17	Call for Abstracts: 18th Young Geotechnical Engineers Symposium 2026 (YGES 2026)	20
10th Conference of the Croatian Geotechnical Society: Geotechnical Engineering in Soft Rocks and Heterogeneous Rock Masses—an ISRM Specialized Conference. Abstract submission is now open	17	- Geo-Institute ASCE	20
53rd ISRM Online Lecture will be given by Dr Mark Diederichs from Canada on 19 March, at 10:00 UTC	18	News	20
3rd National Symposium on Geotechnical Engineering to be held by Morocco	18	DIGGS Version 3.0 Released: Enhanced Capabilities for Geotechnical Data Exchange	20
53rd ISRM Online Lecture by Dr Mark Diederichs (Canada) is now online	18	- ICOLD European Club (EURCOLD)	20
ISRM 2025 News Journal is now online	18	Dams & Reservoirs Day	20
19th ISRM Young Members' Seminar Series on March 31 st	18	- Society for Earthquakes and Civil Engineering Dynamis	21
- International Tunnelling Association	18	Borehole seismometer installation at Bradwell B for enhanced earthquake detection and site characterization for seismic hazard assessment	21
News	18	Διακρίσεις Ελλήνων Γεωτεχνικών Μηχανικών	23
ITACET Lunchtime Lecture Series #55	18	- Άντα Αθανασοπούλου - Ζέκκου 2026 USUCGER Diversity, Equity and Inclusion Award recipient	23
- British Tunnelling Society – Young Members	18	- Κατερίνα Ζιωτοπούλου Board-Certified Geotechnical Engineer (BC. GE)	23
Workshop - Design of Timber Headings	18	Προσεχείς Γεωτεχνικές Εκδηλώσεις:	25
- International Geosynthetics Society	19	- 21 st Pipeline Technology Conference	25
News	19	- EGU26 European Geosciences Union General Assembly - Session ITS4.29/NH13.15 Advances in Landslide Investigation and Mitigation: Bridging Research and Engineering Geology Practice	25
Company History: Strata	19	- Second ISRM Commission Conference on Estimation of Rock Mass Strength and Deformability	26
An Interview with Gautam Dalmia, CDO at Strata Geosystems	19	- DFI S3: Slopes, Support, and Stabilization	27
Strata Geosystems and Venus Interlinings: Strategic Partnership	19	- CAVING 2026	27
Strata Geosystems Case study: Valencia Landfill	19		

- CouFrac2026 5th International Conference on Coupled Processes in Fractured Geological Media: Observation, Modeling, and Application 28
- HYDRO 2026 Adapting to change ~ Embracing opportunities 29
- Spilt'26 10th Conference of the Croatian Geotechnical Society: Geotechnical Engineering in Soft Rocks and Heterogeneous Rock Masses - an ISRM Specialized Conference 30
- WLF7 7th World Landslide Forum - Theme: Landslide Science and Practice for Safe and Resilient Communities 30
- 9th International Conference on Unsaturated Soils 31
- 1st International Conference on Sustainability in Geotechnical Engineering (ICSGE 2027), Geodiversity & Resilience 32
- ICSE|3 International Conference on Scour and Erosion (ICSE) 33

Ενδιαφέροντα Γεωτεχνικά Νέα 35

- Dams around the Earth 35
- The 20 February 2026 garbage landslide at Rodriguez, Rizal in the Philippines 35
- A dramatic rockfall on the E134 road at Fjæra in Etne, Norway 36

Ενδιαφέροντα - Σεισμοί & Αντισεισμική Μηχανική 37

- Land Subsidence and Earthquake-Timed Vertical Offsets in the Messara Basin, Crete: EGMS-Based Screening for the 2021 Mw 6.0 Arkalochori Earthquake 37

Ενδιαφέροντα - Γεωλογία 38

- 'I live in constant fear': surge in giant sinkholes threatens Turkey's farmers 38
- Τεκτονική «ανατροπή» από το Χάρβαρντ: Ο φλοιός της Γης βρισκόταν ήδη σε κίνηση πριν από 3,5 δισ. Χρόνια 40
- Paleomagnetic detection of relative plate motions and an infrequently reversing core dynamo at 3.5 Ga 41

Ενδιαφέροντα - Περιβάλλον 42

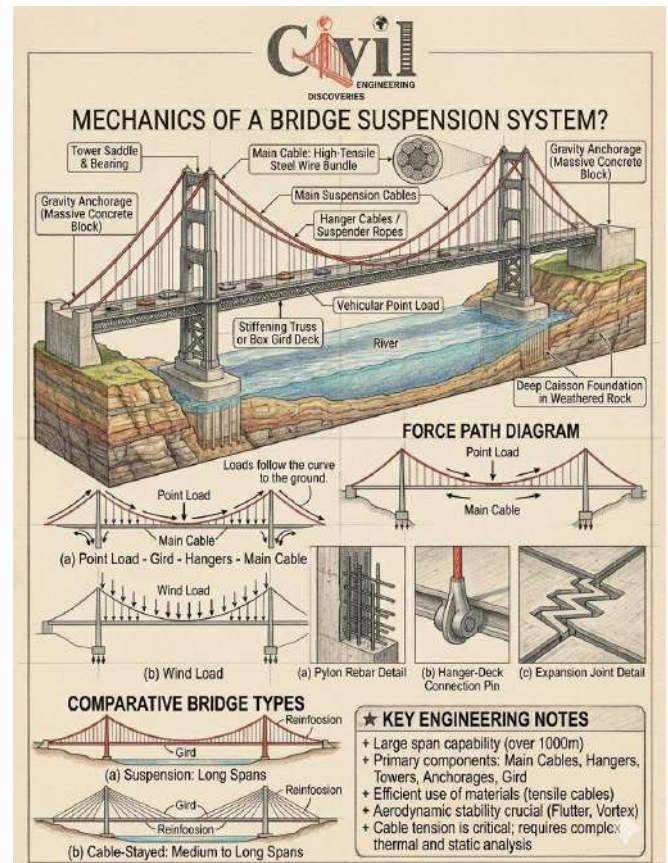
- Climate change slows Earth's spin: Day lengthening unprecedented in million years 42
- Το Ηνωμένο Βασίλειο ρίχνει τιμνωτόλιθους 6.000 κιλών στη θάλασσα: Στόχος να ανακτήσει κάτι που έχασε πριν από έναν αιώνα 43

Ενδιαφέροντα - Λοιπά 44

- Greece enters the astronaut era as scientist joins ESA training programme 44

Νέες Εκδόσεις στις Γεωτεχνικές Επιστήμες 45

Ηλεκτρονικά Περιοδικά 46



Coire Glas Exploratory Works: Building Understanding

The BTS evening meeting in September 2025 heard a lecture of the Exploratory Works for the planned Coire Glas pumped storage hydropower project, in Scotland.

Speakers were Sean Murchie, Engineering Geologist with project developer SSE Renewables; Tom Taplin, Engineering Geologist in the design joint venture of Stantec-Cowi; Joe Coxson, Tunnel Agent with contractor Strabag; and, Tom Robinson, Engineering and Technical Manager with Strabag.

They have kindly coauthored this report on their presentation.



Testing niche construction in Gallery-B of Coire Glas Exploratory Adit PHOTO CREDIT: JOE COXSON

After the summer break, on 18 September 2025 a large audience returned to the Telford Theatre at the ICE, in London, for an insight into the recently completed Exploratory Works for the Coire Glas hydropower project under development in Scotland. The night was also notable as the first time, of hopefully many, when a joint lecture has been held with (mostly) BTSYM speakers to the full membership.

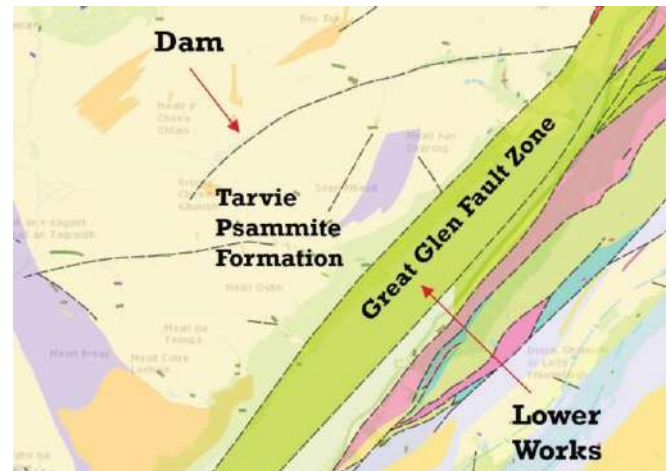
For a relatively small project, it would have been a wonder to some why four speakers were necessary, but as it would become clear, Coire Glas was a model of collaboration, and all the key players in the venture were represented.



Loch Lochy and the Coire Glas Exploratory Adit, aerial drone photo PHOTO CREDIT: IAIN MURCH

The night was an honest retelling of the full story of a project, from inception to completion, although in this case it's only the first chapter in what will be the biggest scope in underground works of its kind in the UK in a generation.

The presentation kicked off with an overview of the full Coire Glas scheme, an ambitious pumped storage hydroelectric power station, capable of up to 1,300 MW generation, and 30 GWh's long duration storage. Sean Murchie, Engineering Geologist for the project developer, SSE Renewables, started off by taking us through the landscape of this part of the Great Glen, with the plant's lower works on the banks of Loch Lochy, and the upper reservoir located in a convenient horse-shoe of the Munro 'Sron na Coire Garbh'. In between the two, sits Sean Mheall, the Southern ridge of the Munro, and it is inside of this mountain that the workings of Coire Glas will be situated: turbines; pumps; watercourses; surge shafts; and, kilometres more of access tunnels.



Published geology of Coire Glas site (annotated BGS area map)

The concept of the Exploratory Works came from SSE's commitment to obtain detailed Ground Investigation (GI), to de-risk their future works, especially given the size and scale of the planned excavations. It was stressed that although the broader Great Glen has been studied extensively, relatively little site specific information was available and this was identified as a project risk early on.

Those that are aware of the geological history of the Great Glen, the longest fault line in the UK, will understand that it was likely to be an interesting study. The published geology for the site included two main domains: the Great Glen Fault Zone itself, including heavily sheared and brecciated fault rocks, these cataclastic rocks having a predominantly quartzite or psammite protolith, with subsidiary amounts of semipelite, amphibolite and metacarbonate; then, to the North, the Tarvie Psammite Formation, consisting of more competent meta-sediments – predominantly psammite (metamorphosed sandstone) with subordinate bands of semipelite and/or pelite.

Sean continued with a rundown of SSE's strategy for the Exploratory Works, involving a two pronged approach: a campaign by Fugro of conventional surface GI (in some unconventional locations, such as a borehole from the top of the mountain and others from the floor of the coire (glacial hollow); and, the underground works by Strabag, accessing areas that surface drilling simply couldn't reach. This would be made possible with the construction of the Exploratory Adit – a relatively small heading, originally planned at 900m in length, and then to be followed by a campaign of underground GI, to target the locations of key structures even deeper underground.



Adit portal construction PHOTO CREDIT: JOE COXSON

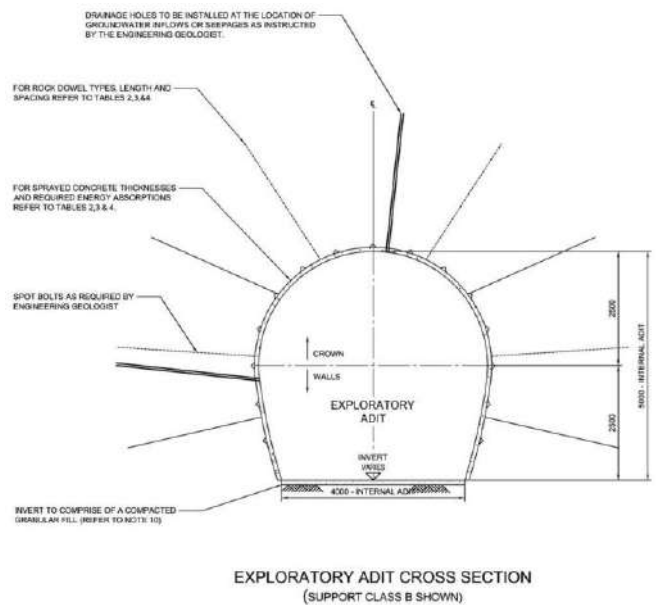


Underground GI core logging PHOTO CREDIT: TOM ROBINSON

The design for the Exploratory Adit had to be undertaken with only the geological information already available, supplemented by some limited surface outcrops, and a healthy amount of engineering judgement. Tom Taplin, Engineering Geologist in the design joint venture of Stantec-Cowi, the client's Designer, explained how the factors at play were run through the Q-system, taking into account rock quality, jointing, and stress influences, for a range of anticipated conditions. This analysis resulted in a suite of conservative designs, or support classes, from A to D, that could be installed depending on the actual conditions encountered underground.

For areas of better ground, like Class-A/B, ground support consisted of a thin sprayed concrete lining (SCL), with either spot bolting, or systematic bolting respectively. If conditions deteriorated, Class-C support included lattice girders and overhead spiling. Class-D was for the worst of conditions, an-

anticipated within the Great Glen Fault Zone, and would employ H-Beams, spiles, face bolts, and a closed invert. The designs also included the construction of wider passing bays and turning niches, to facilitate construction, and the drilling gallery at the Adit's inbye end.



Design excerpt of support Class-B design PHOTO CREDIT: STANTEC-COWI

Strabag got access to the site in December 2022, not exactly earth works season in the Highlands of Scotland, noted Joe Coxson, Tunnel Agent with Strabag. There were other complexities to the mobilisation, owing to the site's Loch-side plot and the single track lane running to it. These problems were overcome with an initial delivery of plant using a barge via the Caledonian Canal, and then some targeted improvements and strengthening of bridges along the Kilfinnan Road.



Geologist undertaking face mapping PHOTO CREDIT: THRUDUR HELGADOTTIR

The works on site over the first winter involved felling of the commercial woodland for the required compounds, then preparations of all the support functions required for tunnelling; offices, welfare, batching plant, water treatment plant, explosives magazine and workshops. The work compounds themselves were completely off-grid, with no access to power, water, waste disposal, or any telecoms connection – all had to be set up from scratch to supply the tunnelling, and deal with any discharge.



Epiroc Boomer S2 in action PHOTO CREDIT: JOHN ZAMMIT

Another early consideration was the tunnel spoil, which wouldn't be leaving the site, given it wasn't viable to transport the quantities involved along the Kilfinnan Road – not to mention this material is likely to be incorporated into future works, so it isn't really waste at all. Instead, the most suitable area was selected to hold the material for the duration of the works, and beyond, with a design for this Spoil Storage Area undertaken by Arup.

Work on the Adit itself started in March 2023, with the first blast of what would eventually be slightly more than 500 advances on the project. A pre-split successfully created a clean rock face for the portal, with soil nails supporting the slope above, then rock dowels and netting below. Credit is due to RJ McLeod and Albion Drilling, whose local workforce were indispensable during this stage of the mobilisation.



Photo of exposed geology and corresponding face mapping sketch at Advance 284 of the Adit PHOTO CREDIT: ANTONIA DECMAN

The tunnelling crew's first activity was creating a false portal at the tunnel eye, consisting of a lattice girder and a sprayed concrete arch. This allowed a full test of the tunnelling systems before excavation commenced, and valuable familiarisation with the equipment itself. The traditional blessing of our Santa Barbara was held in mid-May, thanks to Father Danny from the local parish, and tunnelling got underway.

Joe continued with an overview of the Adit's long section, with an initially steep decline of 7%, then a shallower 4% after the first hundred metres. Passing bays were planned roughly every 250m, each with a turning niche. The majority of the Adit was on a slight right-hand curve, towards the planned underground powerhouse location.

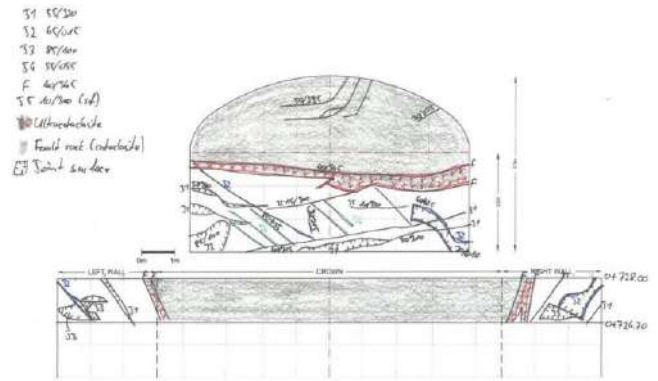


Photo of exposed geology and corresponding face mapping sketch at Advance 284 of the Adit PHOTO CREDIT: ANTONIA DECMAN

The full drill and blast cycle was explained, with an overview of the equipment used, and engineering tools at the team's disposal, such as Epiroc's Underground Manager software, for creating and implementing drill plans, and Amberg Tunnel software for checking profiles and recording as-builts.

An interesting feature of the Exploratory Works was the effort devoted to face mapping. Two engineering geologists had a full hour to map, if required (which would have enraged most over-eager Pit Bosses) as, for the support class system to work, it was vital that each advance was properly captured. The agreed upon Q-value determined by the geologists dictated the ground support to be installed. The geologists were also empowered to instruct any 'toolbox measures' – pre-authorized in a Required Excavation Support Sheet (RESS) – if they deemed any features required additional support.



Three geologists face mapping PHOTO CREDIT: OLLY PAGE

The Works were procured on NEC3 Option B contract, priced with a Bill of Quantities, enabling scaling to match the installation of each support class.

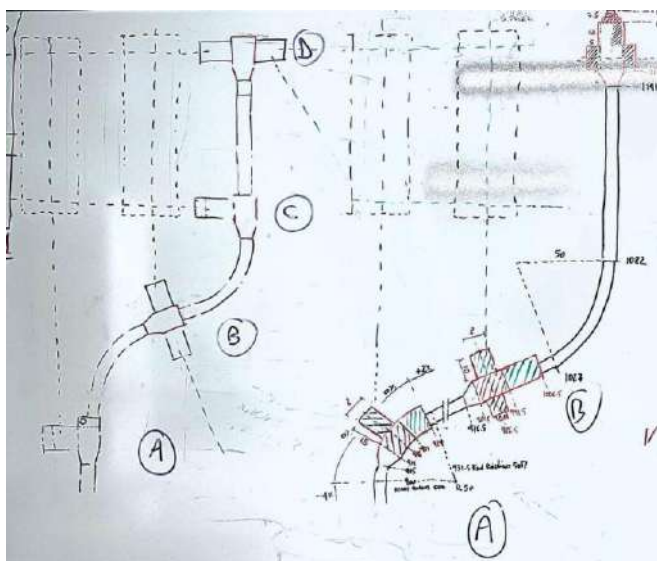


Driller's inside view with Boomer in action PHOTO CREDIT: JOHN ZAMMIT

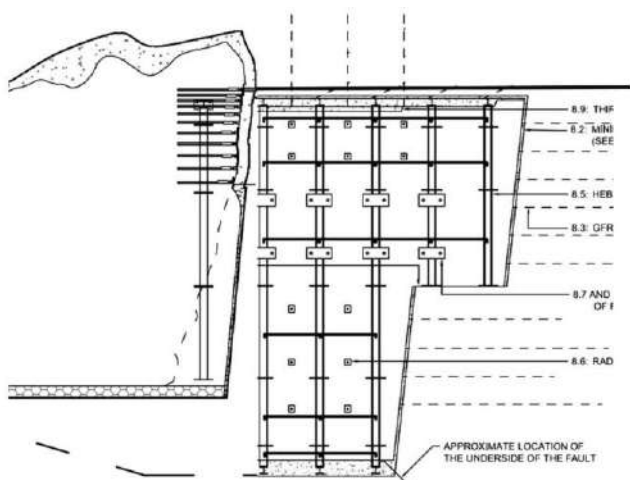
Also explained was a rundown of the blasting methodology in use, of interest to those who've not yet tried their hand at hard rock tunnelling. Given the tunnel's length, it was more economical to use cartridge emulsion explosives, which were initiated with a conventional non-electric system.

A standard 3m tunnel advance had 66no. charged holes, and 4no. void holes around a 'burn cut', using roughly 180kg of product. The powder factor here was on the higher side, but given the Shaeff tunnel excavator in use had an apron and conveyor system, good fragmentation was key. Detonators ranged in delays from 0ms to 7000ms, dictated by the blast pattern in use, and all were initiated simultaneously using bunch connectors.

More interesting techniques were also required for some of the different tunnel profiles. A wedge cut was successfully trialled for enlarging an area for a passing bay, with two wider perpendicular advances, followed by a section of slashing. Smooth blasting was also required for some of the in-situ stress testing later in the works – not easy in the highly deformed geology. The larger profiles of the drilling gallery required 140no. charged holes, and upwards of 300kg of product per blast.



Tunnel extension hand sketch PHOTO CREDIT: STEFAN TRENKWALDER



Class-SQ horizontal spiling sketch PHOTO CREDIT: JOE COXSON

Tom T took over here to give an overview of the importance of not just the face mapping, but all of the geological deliv-

erables that were an output of the Adit's construction. Given the scope of the Exploratory Works, he pointed out, the data collected along the way was as important as the construction itself.

Along with the mapping records, completed by both the Strabag and the Stantec-Cowi geologists, there was also a detailed LiDAR and photogrammetry record of each advance, which provides an unaltered record of the exposed ground, regardless of the support later installed. Forward probing was maintained ahead of the tunnel face, to give early warning of any weak zones, or more importantly, water ingress. A pre-excavation grouting rig was on hand in case of any severe water strikes, but thankfully never used.

The Epiroc jumbo in use also provided 'measure while drilling' (MWD) data for every probe hole, blast hole and rock bolt drilled, which when collated, formed a very visual representation of the geological conditions. Tunnelling continued steadily through to November 2023, clocking to reach beyond Ch 700m, almost into the final stretch to the drilling gallery. It was at this point that a feature was encountered consisting of very poor, highly deformed rocks, with ground conditions that fell outwith the existing support classes.



Photo of exposed geology and corresponding geologist's sketch at Advance 391 PHOTO CREDIT: TOM TAPLIN

By the next advance this feature was present in almost half the face, and was evidently much poorer ground than accounted for at this depth. In the hope this was a finite feature, an additional short advance was undertaken, but the poor rock continued up to the crown yet again. Additional support was instructed in this area, and tunnelling brought to a safe stop. Sean explained how SSE tackled the issue on all fronts, and was keen to highlight this period being noteworthy for the collaboration between all of the teams on site.

Given tunnelling was on hold, waiting for detailed GI before starting the design wasn't an option. From the information available and numerical modelling, Stantec-Cowi proceeded with conservative lining design for the location, the assumptions for which could be verified later on. This design, which became known as Class-SQ, consisted of a fully circular H-beam, excavated as a staggered top heading and bench, with further temporary support from face bolts and overhead spiles installed in every advance.



Zublin setting up for drilling at the fault zone PHOTO CREDIT: TOM ROBINSON

This design was turned around within weeks of intercepting the fault, and allowed for the H-beams and additional support materials to be ordered before the Christmas shutdown.

Initially, probing was the only investigation method available, which successfully located the fault plane dipping down above the tunnel crown, but was unable to estimate the farthest extent ahead of the face. Tom Robinson, Engineering and Technical Manager with Strabag, detailed how more detailed information was obtained. Strabag mobilised one of sister company Zublin's drilling crews (who were conveniently already lined up for the later GI works) to do an exploratory borehole at the tunnel face.

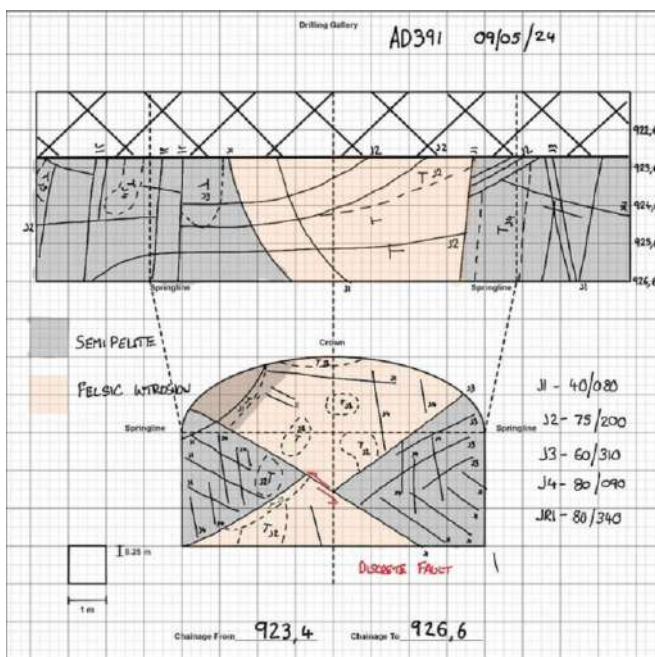


Photo of exposed geology and corresponding geologist's sketch at Advance 391 PHOTO CREDIT: TOM TAPLIN

This provided a full long section of the fault zone that could be logged and its characteristics understood, and also samples that could be sent for lab testing ahead of construction. Amberg also assisted at this stage, utilising their Tunnel Seismic Prediction surveying, its first use in the UK, to generate a 3D interpretation of the fault zone.

Despite the safe stop, Joe assured us that Strabag's tunnelling team were not inactive at this time, and preparations were required underground before works could restart. A section of tunnel behind the fault zone was enlarged for a passing bay and turning niche – needed for more working room. Additional support was installed at the tunnel face, consisting of reinforced 'Norwegian Ribs' and additional bolting. Tunnelling workshops were held regularly during this period, allowing for optimisations in the construction of the Class-SQ lining to be discussed, and roadblocks overcome. The Adit's alignment was shifted to allow for the initial excavation to be protected by horizontal spiling, preferable to drilling them inclined each advance. An alternative excavator was brought in, better suited for the new excavation profile, and injection hoses were proposed instead of steel packing behind the H-beams. Everyone's objective was to get through the fault zone as quickly, and safely, as possible.



Steel ribs and Class-SQ top heading excavation, respectively PHOTO CREDIT: JOE COXSON

Tunnelling restarted in early March 2024, the team utilising a road header and soft ground support more common in London than in the Highlands. As conditions improved, blasting resumed, and it became suitable to transition to a larger horseshoe top heading and a double length invert excavation. In all, 28m of Class-SQ was installed, before transitioning back into a horseshoe shaped profile and use of regular support. Despite the reduced advance length and time consuming support installation, the team had managed to average more than 1m/day progress through the fault zone; commendable under the circumstances.

On most projects, it would be difficult to be positive about a three month stoppage due to poor ground conditions, but Sean reiterated that one of the key objectives of the Explor-

atory Adit was to characterise the ground conditions. Therefore, having a better understanding of the location and nature of this fault zone prior to Main Works construction will benefit the project in the long run. In fact, SSE were so happy with the data being obtained from the Exploratory Works that, in May, they took the decision to extend the Adit by 300m, and instructed an additional two drilling galleries. The data from the Adit was being reviewed in real-time to verify assumptions against the Reference Design for the Main Works, and the extension provided an opportunity to obtain quality tunnelling GI all the way to the depth of the proposed turbine caverns.



Steel ribs and Class-SQ top heading excavation, respectively PHOTO CREDIT: JOE COXSON

There was also a cost-time benefit with the upcoming underground GI works. An extra couple of months of tunnelling actually reduced the number of long exploratory holes, and opening up more work areas allowed for simultaneous drilling. It also provided a much better spread of locations for in-situ stress testing, and closer to the caverns themselves.

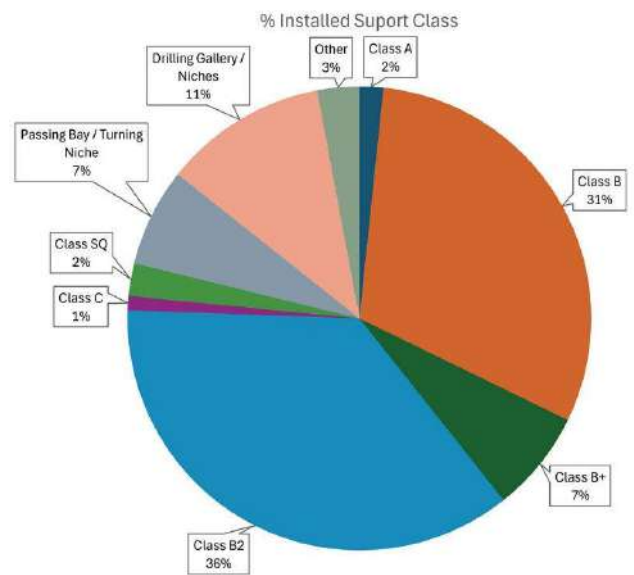
While the extension to the Exploratory Adit came as somewhat of a surprise to the team, it would be just another challenge to overcome, and quickly. Of the 176m of tunnel remaining before the first drilling gallery, 153m of that was constructed in that April alone, the best month on record. Building on from the team dynamic of the fault zone, everyone had their responsibilities, and had to understand each other's constraints. A new alignment was required, which Stantec-Cowi had to thread through the area of the future main work structures, to avoid later clashes. Strabag had to secure labour, support materials, explosives, and sufficient plant and equipment to facilitate the extra tunnelling. SSE had to coordinate the effort, ensuring they were getting value for money from the extra work.

The design ended up including seven different profiles, up to 8m x 6m, and included a much tighter radius bend to site the last gallery in the optimum position. No matter, just three months later, on 1st August 2024, advance 502 was blasted, the last on the Exploratory Works.

Tom T took this opportunity to run through a summary of all the tunnelling GI that was obtained from the Adit's construction. The vast majority of the tunnel, almost three quarters, was supported as Class-B (or a variation thereof) with a Q-value of 1.0 to 3.0. Water inflow included strikes up to 30 l/min, but thankfully all but half a dozen were finite, and petered out within an hour.

The stitched together LiDAR scans provided an excellent fly-through of the entire tunnel, in its unsupported state, and

can be used for analysis of joint orientations, along with assisting the construction team with space proofing. All the MWD data has also been collated, which shows the relative hardness of the ground throughout the adit.



Tunnel support class pie chart PHOTO CREDIT: JOE COXSON

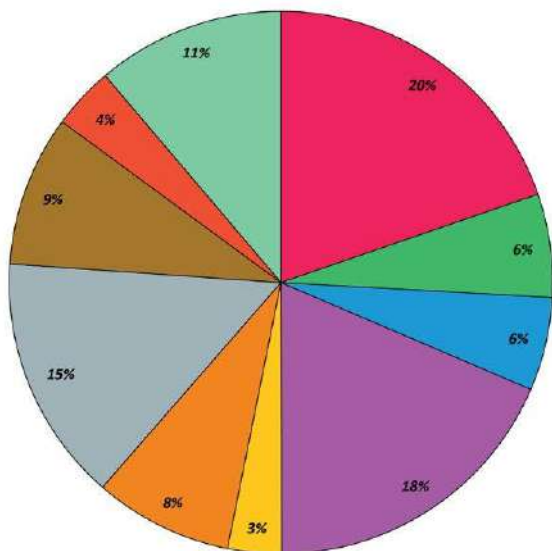
It was Tom R's responsibility to organise and oversee the second phase of the works, the Underground GI. This looked very different from its original scope after the extension, but at least the constraints of the drilling equipment had been properly understood while the extension design was evolving. Strabag has the benefit of Zublin, also operating in the UK, and their first rig commenced drilling within weeks of the tunnel's completion. The scope now included almost 2km of wireline and conventional exploratory core drilling, along with a host of in-hole geophysical testing, all to target the planned location of key underground structures.

Strabag's geologists continued to be busy underground, as all the core samples were logged and photographed to exacting standards, before being transported to surface, to minimise disturbance. A large contingent of subcontractors assisted with the specialist geophysics. There are too many to mention all but Robertson Geo deserve special recognition for their collaboration with Zublin to undertake tests in non-conventional shallow and even uphill inclinations. Plate jack tests were also undertaken, by Sol-Experts, in specifically constructed niches in Gallery-B and Gallery-C. These tests involved putting huge forces into the tunnel walls, through a large hydraulic ram, and measuring displacement within the rock mass.

With the last of a suite of overcoring tests completed in early December, in barely four months one of the most comprehensive underground GI campaigns of its kind in recent years was concluded. That said, it was another couple of months before the real deliverable, a 5,500 page Factual Report, was completed, a collation of every relevant record of the GI works, which should keep Stantec-Cowi busy until the Main Works commence.

Joe took over again for a recap of the project in numbers, before drawing attention to some of the project's achievements. Tackling what was initially one of the biggest hurdles, a UK 'hard rock skills gap', ended up being one of the main successes, with experienced drillers, newly qualified shotfirers, and engineering geologists upskilled for face mapping and core logging, all now available for future works.

Tunnel Production Breakdown



■ Drill ■ Charge ■ Blast ■ Muck ■ Scale/Trim
■ Map ■ Spray ■ Rock Bolt ■ Misc. ■ Delays

Tunnel progress analysis PHOTO CREDIT: TOM WATERHOUSE

The project's reporting provides a powerful insight into the progress data, to inform on works planning and mitigate the main sources of delays. The rate of tunnelling increased steadily over the course of the project, another healthy sign for the upcoming works.

Another success was the relationship with the local Scottish Fire and Rescue Service (SFRS), whose commitment to support the project was invaluable.

Regular contact, including desktop exercises, underground inductions, and evacuation drills, ensured the SFRS knew what works were happening on site, and what resources were available in the event of an incident.

There were also significant technical innovations, not least of which was the use of tunnelling for GI itself.

The British Geological Survey (BGS) has been involved in the project from early on, and they've received further valuable insight into an area of significant geological interest. On the construction side, the methodologies that have been developed during the course of the works, such as smooth blasting, could have a huge saving in time, cost and wastage during the Main Works. The Underground GI also included some significant 'firsts' in hard rock techniques.

Successfully managing the ground risk was the most important safety consideration for the works, but the standard of more conventional H&S practice on site is also deserving of mention. The project has clocked more than 500,000 man-hours and is now 2+ years without a Lost Time Incident (LTI).

Given the site's location, managing environmental hazards has also been a big consideration. The Scottish Environment Protection Agency (SEPA) granted abstraction and discharge licences to the site in 2023, and during the course of the Works more than 160,000m³ of tunnel effluent was successfully uplifted, treated and returned to Loch Lochy, within strict water quality criteria. Seventeen Planning Monitoring Office inspections over the course of the Works have been made without a single non-compliance.

The project has welcomed visits by SEPA, the Highland Council, Nature Scot, and other local stakeholders, giving them insights into what tunnelling involves, which should assist them when working with us in future.

It would be remiss not to also mention the project's recent accolades, including Project of the Year at the 2024 NCE Tunnelling Awards, and GI Project of the Year, two years running, at the Ground Engineering Awards.

Finally, deserving of one last mention, the collaborative spirit between Client, Designer and Contractor at Coire Glas was perhaps the greatest success, and allowed the project to overcome significant hurdles, and everyone came out the other side still on good terms!

Sean brought the presentation to a close with another note of thanks to everyone involved, but not before answering the question on everyone's lips. What's next? Coire Glas is awaiting its final investment decision from SSE, which is heavily dependent on the outcome of the Government's Long Duration Energy Storage (LDES) 'cap and floor' payment mechanism. Engagement with the Designer, along with civil and M&E contractors, to finalise the scheme is ongoing. The plan is to commence Main Works construction once funding is secure, with the scheme to be completed in the early 2030's.

Q&A

The speakers took questions following their presentation.

Q: Were you able to target all of the important underground elements required for the Main Works?

Sean: The Exploratory Works targeted structures based on a preliminary Reference Design, which will be refined for the Detailed Design. We have a good body of information for the Adit alignment, but also have the findings from the surface and underground GI. We're confident we've carried out the most detailed GI possible at this stage.

Q: Is it anticipated that the fault zone encountered could intersect with any underground structures?

Sean: Review of the ground modelling is still ongoing, but with the fault discovered and its character understood, the position of structures can be reviewed to avoid interacting with it, or appropriate support designed.

Q: Are you doing long-term convergence monitoring? In the SQ section, was immediate support required?

Joe: Yes, quarterly monitoring is ongoing. During construction a regime of daily, weekly and monthly monitoring was completed, based upon support class. We continue to have had little movement since the monitoring arrays were installed. In the fault zone, we saw 2mm-3mm of convergence, especially at the base of the horseshoe, before the invert was fully closed, implying immediate support was required.

Q: Were there concerns about tunnel collapse during construction? How did you manage the risk?

Joe: Up to the fault zone, there was a lot of confidence that the ground support was suitably robust, given the support class system in use. The fault zone was a genuine concern, given the poor rock, and even with robust initial support installed, the Designer required additional measures for long term stability.

Q: What does Class-SQ stand for? What will the Exploratory Adit be used for long term?

Sean: SQ was a code without a specific meaning that stuck. Given the tunnel's position, the current idea is it will be useful for access, but exactly how is in planning.

Q: Why was a reduced diameter borehole used for the exploratory drilling?

Tom R: Borehole diameter was dictated by the size of the rigs in use. The diameters used in vertical drilling on surface weren't possible with rigs suitable for underground use. We considered HQ (63.5mm-diameter core size) to be sensible, given the equipment, and the distances of drilling required almost entirely in hard rock. This was agreed early on with the Designer, and did not affect the lab testing.

Q: Did surface GI findings affect decisions? Was it possible to interpret the fault zone thickness?

Sean: This was a separate package of works, but the Designer received data from both the surface and tunnelling GI, which was being assessed in real-time, so was able to influence their decisions. The fault zone wasn't encountered from the surface boreholes, given the location that it intercepted the steep hillside above.

Tom R: Some of the underground boreholes were used to target the fault zone, to ascertain its position, with some success.

Q: What type of rock bolts have been installed? If it becomes a permanent adit, will it have to be re-lined?

Joe: Almost all rock bolts were fully grouted galvanised steel dowels, ranging from 25mm-32mm diameter, and 3m-3.6m in length. Some self-drilling hollow bars were utilised in the softer rock of the fault zone. GFRP bars were used in some instances, where longer bolts were required, given their reduced weight.

Sean: There is no plan for the Adit to be used as a permanent hydraulic tunnel. If it were to be used long-term as an access tunnel, a design review would be carried out.

Q: Have investigations been carried out on the stockpiled material, for re-use?

Sean: Yes, we have intentions to re-use the stockpiled material. We have conducted laboratory testing to understand its properties.

Q: Why do you think there was so little groundwater inflow during probing? Is the inflow from surface water?

Tom T: The most persistent inflows early on are possibly connected to streams on surface. All the other water encountered would have been from localised pockets, as it dried up after a short time.

Joe: Water strikes occurred during the underground GI. Two of the longest boreholes remain open to record inflow. Geological monitoring is ongoing, e.g., with piezometers, extensometers.

Q: What is the expected design life of the Exploratory Adit?

Sean: Given the scope of the works, the current Adit design life is short-term.

Q: How far from the Adit was drilling for overcoring tests? Stress regime?

Tom R: Overcoring too close to the Adit was avoided, to ensure valid results, which as a rule was taken to be a horizontal depth greater than the excavated span in that location. The testing also had to be targeted to areas that were unfractured, and the shallower the testing the easier the method. Depths were agreed with the Designer on site. The K-ratio and overall orientation were difficult to determine, given the

geological setting. Results varied, and need to be reviewed in conjunction with the other underground geophysics, which is currently ongoing by the Designer.

Q: Were boreholes drilled from surface to tunnel level?

Sean: Surface GI included a steeply inclined borehole to 650m depth, in the planned location of the surge shaft, drilled from a compound on the top of the mountain, only accessible by helicopter.

(Staff Writer / TUNNELS & TUNNELLING, February 17, 2026, <https://www.tunnelsandtunnelling.com/analysis/coire-glas-exploratory-works-building-understanding/?cf-view&cf-closed>)

DIGGS Version 3.0 Released: Enhanced Capabilities for Geotechnical Data Exchange

Created: 30 Mar 2026



The DIGGS Technical Committee is pleased to announce the release of DIGGS v3.0, bringing significant enhancements to the geotechnical data exchange format. This new version introduces important improvements to interoperability, expanded capabilities for specialized applications, and a streamlined architecture that will benefit both software developers and end users.

What's Driving the Change?

The release of DIGGS v3.0 codifies incremental changes to the DIGGS development schema that has occurred over the last ~15 months in response to real-world needs identified through industry use and feedback. Key drivers for this update include:

- **Improved Interoperability:** Insights from the 2025 DIGGS Hack-a-thon revealed opportunities to constrain encoding options and reduce ambiguity, making it easier for different software systems to exchange data reliably
- **Better Maintainability:** Enhanced internal documentation and reorganized schema modules make the standard easier to understand, implement, and maintain
- **Expanded Capabilities:** New support for emerging workflows including geophysical surveys, pile installations, and measurement-while-drilling (MWD) operations

Major Enhancements in Version 3.0

Improved Schema Organization

DIGGS v3.0 features a completely reorganized set of schema files, with better-documented, modular components. The schema has been split into focused modules including:

- **Core modules:** Abstract Type, Common, Core, and Measure Type modules provide the foundation
- **Specialized modules:** New dedicated modules for linear and local spatial referencing, deep foundations, grouting, geophysics, and extended features
- **Smaller, more manageable files:** The modular approach makes it easier for developers to understand and implement specific capabilities

Core DIGGS Profile

A new "Core Geotechnical Profile", a subset of the full DIGGS schema, has been defined to support the most common geotechnical data exchange scenarios:

- Existing ("as-built") boreholes, soundings, and trial pits
- Soil and rock sampling and descriptions
- Common laboratory and in-situ test procedures and results
- Basic equipment and specimen information

This profile provides a clear starting point for basic implementations, while maintaining extensibility for specialized applications.

Enhanced Measurement Framework

- **Unified time-series structure:** All time-series measurements (general monitoring, pile driving, grouting activities, MWD) now follow a single, consistent structure
- **Improved Units of Measure (UoM) support:** A new online Unit of Measurement Dictionary that supports unit conversions and specialized geotechnical units
- **Better observation handling:** Interoperability improvements for observations and measurement procedures

Spatial Reference Improvements

- **Engineering Coordinate Reference System (CRS) support:** CRS definitions (including an enhanced Cartesian CRS definition) can now be included in a DIGGS instance, making it easier to incorporate local, project-specific coordinate systems within DIGGS.
- **Enhanced linear referencing:** Improved framework for referencing locations along linear features like boreholes or transects, including relative referencing from a referent, handling stretched/compressed core samples, and referencing via station/offset.
- **Reduced gml:id requirements:** Simplified requirements for GML identifiers where they're not essential

New Domain Support

Version 3.0 expands DIGGS capabilities to include:

- **Pile driving and PDA records:** Support for transfer of pile installation and PDA records
- **Geophysical field surveys:** Metadata and raw data support for geophysical survey work
- **Measurement While Drilling (MWD):** Data exchange for MWD operations and measurements

Understanding Backward Compatibility

DIGGS Version 3.0 is not backward compatible with version 2.6. This was a deliberate decision to enable the improvements and standardization that were necessary. However, the impact has been carefully managed and the vast majority of commonly used v2.6 objects will validate under v3.0 without modification. Most non-compatible changes fall into these categories:

1. **Constraining best practices:** Well-coded 2.6 instances following best practices will require minimal, if any, changes
2. **Specialty features:** Most breaking changes affect specialty objects (grouting, geophysics) that have seen limited implementation in v2.6.

Migration effort will likely be minimal for most implementations. To aid in migration, comprehensive documentation of all changes is available on the [Version 3.0.0 release page](#). The DIGGS technical team is also developing XSLT stylesheets to assist in converting legacy 2.6 instances to version 3.0. The DIGGS Technical Committee is also available to assist with migration questions.

Getting Started with DIGGS v3.0

- **Schema files:** Available for download from the [Version 3.0.0 release page](#) or directly referenceable at <https://diqgsm.org/schemas/3.0.0>
- **Schema Documentation:** Comprehensive documentation at <https://diqgsm.org/docs/3.0>

- **Example Instances:** Example files in v 3.0 format can be found at <https://github.com/DIGGSml/diggs-examples/tree/master/3.x%20Example%20Instances>
- **Community support:** Join the DIGGS effort to participate in DIGGS' development:
 - **GitHub:** Contribute to our repositories at <https://github.com/DIGGSml>
 - **Monthly Meetings:** Join our monthly online discussions where we tackle all DIGGS-related issues. Contact Allen Cadden (acadden@schnabel-eng.com) or Ross Cutts (rcutts@schnabel-eng.com) to receive meeting invites.

Looking Ahead

DIGGS v3.0 represents a significant maturation of the standard, balancing the needs of existing users with the requirements of new applications and improved interoperability. The DIGGS Technical Committee strongly recommends migration to the v 3.0 standard to not only take advantage of its new capabilities, but to also future-proof legacy data archives.

Learn more about DIGGS at <https://geoinstitute.org/special-projects/diggs>

ΝΕΑ ΑΠΟ ΤΙΣ ΕΛΛΗΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΝΩΣΕΙΣ



10ο Πανελλήνιο Συνέδριο Γεωτεχνικής Μηχανικής Ξάνθη, Οκτώβριος 2027



1η Ανακοίνωση

Η Ελληνική Επιστημονική Εταιρεία Εδαφομηχανικής και Γεωτεχνικής Μηχανικής (ΕΕΕΕΓΜ) διοργανώνει το 10^ο Πανελλήνιο Συνέδριο Γεωτεχνικής Μηχανικής (10^ο ΠΣΓΜ) στην Ξάνθη τον Οκτώβριο του 2027. Κατά τη διάρκεια του συνεδρίου θα γίνονται παράλληλα δύο έως τρεις συνεδρίες και θα διεξαχθεί και τεχνική έκθεση.

Στόχος του συνεδρίου είναι να καταγράψει τις προόδους της γεωτεχνικής μηχανικής στην Ελλάδα και στην Κύπρο, όπως αντικατοπτρίζονται στα σημαντικά γεωτεχνικά έργα που έχουν μελετηθεί και κατασκευαστεί, καθώς και στα αποτελέσματα της ερευνητικής δραστηριότητας των Πολυτεχνείων και Πολυτεχνικών Σχολών της Ελλάδας και της Κύπρου. Επιδίωξη είναι οι εργασίες του συνεδρίου να αναδείξουν πρωτότυπα στοιχεία συμβολής της γεωτεχνικής μηχανικής στα τεχνικά έργα και να προβάλουν θεωρητικές και πειραματικές έρευνες σε εδαφικά, βραχώδη και ημιβραχώδη υλικά που έχουν βρει ή μπορούν να βρουν εφαρμογή στην πράξη.

Οι θεματικές ενότητες του συνεδρίου θα είναι:

- Συμπεριφορά Εδαφών: Έρευνες Υπαίθρου και Εργαστηρίου
- Συμπεριφορά Εδαφών: Προσομοιώματα
- Επιφανειακές και Βαθιές Θεμελιώσεις
- Αλληλεπίδραση εδάφους- κατασκευής
- Βαθιές εκσκαφές- Αντιστηρίξεις
- Πρανή-Κατολισθήσεις
- Σήραγγες και Υπόγεια Έργα
- Βραχομηχανική
- Βελτιώσεις εδαφών
- Φράγματα – Άοπλα επιχώματα
- Οπλισμένα επιχώματα
- Γεωσυνθετικά υλικά
- Οδοστρώματα
- Ευρωκώδικες

- Περιβαλλοντική Γεωτεχνική
- Ενεργειακή Γεωτεχνική
- Εδαφοδυναμική – Τεχνική Σεισμολογία
- Κλιματική κρίση και ακραία φαινόμενα
- Θέματα Γεωτεχνικής Μηχανικής στην Κύπρο
- Πολιτιστική κληρονομιά και Γεωτεχνική Μηχανική
- Διδασκαλία και μάθηση Γεωτεχνικής Μηχανικής

Τονίζεται ότι οι σχετικές συνεδρίες θα υλοποιηθούν εφ' όσον υπάρξει ελάχιστος απαιτούμενος αριθμός άρθρων που να δικαιολογεί ανεξάρτητη συνεδρία, διαφορετικά ενδέχεται να γίνει ενοποίηση συνεδριών ανάλογα με τη θεματολογία. Τα άρθρα είναι με κρίση πλήρους κειμένου.

Το Καλοκαίρι του 2026 θα ακολουθήσει 2η Ανακοίνωση με την ιστοσελίδα του συνεδρίου, την προθεσμία και τη διαδικασία υποβολής περιλήψεων.

Ο Πρόεδρος

Ο Γενικός Γραμματέας

Μ. Μπαρδάνης

Γ. Μπελόκας

Δρ Πολιτικός Μηχανικός

Δρ Πολιτικός Μηχανικός

Προκήρυξη Διαγωνισμού: Επετειακό Λογότυπο για τα 60 Χρόνια της ΕΕΕΕΓΜ (1966–2026)

Η Ελληνική Επιστημονική Εταιρεία Εδαφομηχανικής και Γεωτεχνικής Μηχανικής γιορτάζει το 2026 τα 60 χρόνια από την ίδρυσή της και **καλεί νέους φοιτητές ή απόφοιτους γεωτεχνικούς μηχανικούς έως 35 ετών – ατομικά ή σε ομάδες έως τρία άτομα** – να συμμετάσχουν στον διαγωνισμό δημιουργίας επετειακού σήματος/λογότυπου!

1. Σκοπός

Το επετειακό λογότυπο **θα χρησιμοποιηθεί αντί του καθιερωμένου λογότυπου της ΕΕΕΕΓΜ καθ'όλο το 2026** και για όσο διάστημα αποφασιστεί από την Εκτελεστική Επιτροπή σε: α) όλες τις εκδηλώσεις της ΕΕΕΕΓΜ, β) στο εξώφυλλο του ενημερωτικού δελτίου της ΕΕΕΕΓΜ, γ) σε όλες τις εκδόσεις της ΕΕΕΕΓΜ, δ) στα μέσα κοινωνικής δικτύωσης της ΕΕΕΕΓΜ, ε) στην επιστολική αλληλογραφία της ΕΕΕΕΓΜ και στ) γενικά σε όλα τα φόρα που θα συμμετάσχει η ΕΕΕΕΓΜ κατά το 2026 και σε επόμενα έτη.

Το σήμα θα πρέπει να κάνει **σαφή αναφορά στην ΕΕΕΕΓΜ και στην επέτειο των 60 χρόνια**. Όσοι συμμετάσχουν επισήμως θα λάβουν τη **χρωματική παλέτα της ΕΕΕΕΓΜ**, τα χρώματα της οποίας πρέπει να χρησιμοποιηθούν. **Θα βραβευθούν τρεις συμμετοχές** ανάλογα με την τελική τους κατάταξη, η οποία θα προκύψει από την ψηφοφορία.

2. Συμμετοχή

Δικαίωμα συμμετοχής έχουν **νέοι φοιτητές ή απόφοιτοι έως 35 ετών** που ανήκουν στις κάτωθι κατηγορίες:

- Μηχανικοί (μέλη ή μη της ΕΕΕΕΓΜ) απόφοιτοι από τομέα γεωτεχνικής Πολυτεχνείων ή Πολυτεχνικών Σχολών Πανεπιστημιακού Επιπέδου με κατεύθυνση σε τομέα γεωτεχνικής.
- Φοιτητές Πολυτεχνείων ή Πολυτεχνικών Σχολών Πανεπιστημιακού Επιπέδου που ακολουθούν κατεύθυνση σε τομέα γεωτεχνικής.

Οι συμμετοχές στον διαγωνισμό μπορούν να οργανωθούν ως εξής:

- Συμμετοχή φυσικού προσώπου
- Συμμετοχή ομάδας (έως τρία μέλη, με έναν υπεύθυνο επικοινωνίας).

Η συμμετοχή είναι **δωρεάν**.

3. Τρόπος Συμμετοχής

Η **υποβολή πρόθεσης συμμετοχής** γίνεται μέσω του ms – forms στον σύνδεσμο: <https://forms.office.com/e/YkFWYt4VzL>

Η κάθε συμμετοχή καταχωρεί **υποχρεωτικά**:

- α) τίτλος συμμετοχής (ονοματεπώνυμο ή ψευδώνυμο)
- β) ονοματεπώνυμο όλων των μελών ομάδας
- γ) ιδιότητα (μέλος/η ΕΕΕΕΓΜ ή φοιτήτρια/ητής),
- δ) e-mail υπεύθυνου επικοινωνίας (θα χρησιμοποιηθεί μόνο για τους σκοπούς του διαγωνισμού)

Η **συμμετοχή οριστικοποιείται** με αποστολή στον Γενικό Γραμματέα e-mail gbelokas@uniwa.gr εντός της **αποκλειστικής προθεσμίας υποβολής** με τίτλο "Διαγωνισμός Επετειακού Λογοτύπου – 60 Χρόνια ΕΕΕΕΓΜ" το οποίο περιέχει ή αναφέρει:

- α) Τον τίτλο συμμετοχής
- β) Του αρχείου λογότυπου PNG (με διάφανο φόντο) όνομα αρχείου: **60HSSMGE_[ΤΙΤΛΟΣ ΣΥΜΜΕΤΟΧΗΣ].png**
- γ) Προαιρετικά σύντομη περιγραφή (έως 100 λέξεις) της ιδέας ή του συμβολισμού του λογότυπου.

4. Όροι Συμμετοχής – Διανοητική Ιδιοκτησία και Ευθύνη

Ο διαγωνισμός διέπεται από τους ακόλουθους όρους περι **πνευματικής ιδιοκτησίας**:

α) Κάθε συμμετέχων/συμμετέχουσα δηλώνει υπεύθυνα ότι το υποβαλλόμενο έργο (λογότυπο) αποτελεί **αποκλειστικά δική του/ της, πρωτότυπη δημιουργία**, η οποία δεν παραβιάζει δικαιώματα πνευματικής, ή/και βιομηχανικής ιδιοκτησίας, ή/και άλλα δικαιώματα τρίτων.

β) Ο/Η συμμετέχων/συμμετέχουσα αναλαμβάνει την **απόκλειστική ευθύνη** έναντι οποιουδήποτε τρίτου για τυχόν προσβολή δικαιωμάτων πνευματικής, ή/ και βιομηχανικής ιδιοκτησίας, ή/ και άλλης φύσης, και δη σε περίπτωση που προκύψουν αξιώσεις έναντι της ΕΕΕΕΓΜ.

γ) Η **ΕΕΕΕΓΜ ουδεμία ευθύνη** φέρει για τυχόν παραβιάσεις δικαιωμάτων τρίτων ή για οποιεσδήποτε συναφείς αξιώσεις που ενδέχεται να εγερθούν από τρίτους σε σχέση με το υποβληθέν έργο ή τη μετέπειτα χρήση του επιλεγέντος λογότυπου, και δύναται να στραφεί κατά του συμμετέχοντος για κάθε ζημία που τυχόν υποστεί εξ αυτού του λόγου.

δ) Μαζί με την συμμετοχή στον διαγωνισμό και την υποβολή του έργου (λογότυπου), οι συμμετέχοντες οφείλουν να υποβάλουν **Υπεύθυνη Δήλωση** του άρθρου 8 του Ν. 1599/1986, στην οποία θα δηλώνουν ότι:

- το υποβαλλόμενο έργο (λογότυπο) είναι προσωπική τους δημιουργία,
- το υποβαλλόμενο έργο (λογότυπο) δεν αποτελεί αντιγραφή ή προσαρμογή άλλου έργου, και
- παραχωρούν τα δικαιώματα χρήσης του έργου (λογότυπου) στην ΕΕΕΕΓΜ, σε περίπτωση επιλογής και ανάδειξης του έργου (λογότυπου) από την ΕΕΕΕΓΜ ως νικητήριου έργου (λογότυπου).

- διατηρούν το ηθικό δικαίωμα να αναγνωρίζονται ως δημιουργοί του λογοτύπου.

Υπόδειγμα του περιεχομένου της υπεύθυνης δήλωσης περιλαμβάνεται στο Παράρτημα Ι της παρούσας Προκήρυξης.

Η αναφορά των δημιουργών θα γίνεται σε όλες τις έντυπες εκδόσεις της ΕΕΕΕΓΜ που θα κάνουν χρήση του επετειακού λογότυπου.

Με την κατακύρωση του αποτελέσματος και την ανάδειξη της αξιολογικής κατάταξης των **τριών πρώτων έργων** (λογότυπα), όλοι **οι δημιουργοί τους** θα κληθούν να συνάψουν με την ΕΕΕΕΓΜ συμφωνητικό παραχώρησης δικαιωμάτων διανοητικής ιδιοκτησίας. Υπόδειγμα του περιεχομένου του εν λόγω συμφωνητικού περιλαμβάνεται στο Παράρτημα ΙΙ της παρούσας Προκήρυξης και **καταληκτική ημερομηνία ψηφιακής υπογραφής είναι η 30η Απριλίου 2026 και ώρα 23:59**.

5. Προδιαγραφές Λογότυπου

Οι προδιαγραφές του αρχείου PNG έχουν ως εξής:

- α) ανάλυση: τουλάχιστον 3000 pixels στη μεγαλύτερη πλευρά,
- β) ανάλυση εκτύπωσης: 300 dpi,
- γ) χρωματικό προφίλ: sRGB (σε χρωματική παλέτα που θα γνωστοποιηθεί στην κάθε ομάδα χωριστά κατά τη δήλωση συμμετοχής),
- δ) φόντο: διάφανο (transparent background)

6. Επιλογή

Η **κατάταξη** των τριών πρώτων **και η επιλογή** της μίας θα γίνει μέσω διαδικτυακής ψηφοφορίας, με δικαίωμα μίας ψήφου ανά e-mail.

Δικαίωμα ψήφου θα έχουν όλα τα ταμειακώς ενήμερα μέλη της ΕΕΕΕΓΜ κατά τον χρόνο της ψηφοφορίας.

Κατά την ψηφοφορία, τα μέλη ψηφίζουν ποιο ανώνυμο λογότυπο τους αρέσει περισσότερο (μόνο ένα) και η κατάταξη των λογότυπων καθορίζεται από τον αριθμό των μοναδικών ψήφων που έλαβαν.

Η Εκτελεστική Επιτροπή της ΕΕΕΕΓΜ δύναται να:

- Απορρίψει όποια πρόταση κριθεί ότι δεν πληροί τις προδιαγραφές του διαγωνισμού.
- Ζητήσει ελαφρές τροποποιήσεις, χωρίς παρέμβαση στο αισθητικό μέρος, από τον δημιουργό του επιλεγέντος λογότυπου, ώστε να προσαρμοστεί στους σκοπούς χρήσης του.

7. Βραβεία

Σε όλες τις συμμετοχές θα δοθεί αναμνηστικό σε μια από τις επετειακές εκδηλώσεις τις ΕΕΕΕΓΜ.

Ειδικότερα, **στις τρεις πρώτες συμμετοχές θα απονεμηθεί τιμητική πλακέτα διάκρισης**. Στην εκδήλωση θα παρουσιαστούν όλα τα λογότυπα που υποβλήθηκαν με αντίστοιχη αναφορά στις ομάδες που συμμετείχαν στην κεντρική οθόνη του χώρου εκδηλώσεων.

Η **νικητήρια συμμετοχή κερδίζει επιπρόσθετα** την εξής συνδρομή στην ΕΕΕΕΓΜ:

- α) για ατομική συμμετοχή: **5ετής συνδρομή**
- β) για ομαδική συμμετοχή: **3ετής συνδρομή**

Οι **επόμενες δύο συμμετοχές κερδίζουν επιπρόσθετα 2ετή συνδρομή** στην ΕΕΕΕΓΜ.

8. Προθεσμία υποβολής

30 Απριλίου 2026, ώρα 23:59

9. Περίοδος ψηφοφορίας

Από 5 Μαΐου 2026, ώρα 00:00 έως 15 Μαΐου 2026, ώρα 23:59

10. Ημερομηνία ανακοίνωσης βραβείου:

22 Μαΐου 2026

11. Δημοσίευση – Επικοινωνία

Το επιλεγέν λογότυπο θα δημοσιευθεί στο περιοδικό, στην ιστοσελίδα και στα επίσημα μέσα επικοινωνίας (e-mail, LinkedIn) της ΕΕΕΕΓΜ και θα χρησιμοποιηθεί το 2026 σε όλες τις δράσεις, δραστηριότητες, ενημερώσεις και δελτία της ΕΕΕΕΓΜ.

12. Ρήτρα μη ανάθεσης

Η ΕΕΕΕΓΜ διατηρεί το δικαίωμα να μη χρησιμοποιήσει καμία πρόταση, αν αυτό κριθεί σκόπιμο, το οποίο δεν αναιρεί την απονομή των βραβείων στις νικητήριες συμμετοχές.

Με εκτίμηση,

Η Εκτελεστική Επιτροπή της

Αθήνα, 16/03/2026



International Society for Soil Mechanics and Geotechnical Engineering

ISSMGE News

www.issmge.org/news

ISSMGE Interactive Technical Talk Episode 30: Ground Improvement (TC211)

ISSMGE IT Administrator / [TC211](https://www.issmge.org/education/interactive-technical-talks) / 05-03-2026

The thirtieth episode of International Interactive Technical Talk has just been launched and is supported by TC211. Fanny Maucotel, Jian Chu, Richard Kelly and Norman Burua Adriko are discussing with Marc Ballouz about "Ground Improvement".

Watch ISSMGE Interactive Technical Talks

<https://www.issmge.org/education/interactive-technical-talks>

50 Years of the Bolivian Geotechnical Engineering Association (ABIG)

ISSMGE IT Administrator / Time Capsule Project / 11-03-2026

In 2025, The **Asociación Boliviana de Ingeniería Geotécnica (ABIG)** celebrated its 50th anniversary! They are pleased to present their Society's objectives and main activities carried out in the field of geotechnical engineering in Bolivia.



The Countdown to AYGEC'26 Has Begun – Just 34 Days to Go

Max Barbosa / Young Members / 23-03-2026

The **African Young Geotechnical Engineers Conference 2026 (AYGEC26)** is fast approaching, bringing together young professionals, researchers, and industry leaders from across Africa and beyond.

Organized under the leadership of the Nigerian geotechnical community, AYGEC26 will provide a unique platform to:

- Share cutting-edge knowledge and innovative practices in geotechnical engineering
- Engage in technical discussions, keynote lectures, and panel sessions
- Strengthen international collaboration and professional networks
- Contribute to the development and future of geotechnical engineering across Africa

2629 April 2026

NSE Secretariat, University of Lagos, Lagos, Nigeria

With preparations well underway, the conference is shaping up to be a landmark event for the young geotechnical community.

From the perspective of the **ISSMGE Young Members Presidential Group (YMPG)**, AYGEC26 represents an important milestone in strengthening connections across regional young member groups. The YMPG proudly supports initiatives such as AYGEC, reinforcing its commitment to empowering young engineers, fostering collaboration between societies, and promoting active engagement within the global geotechnical community.

As we approach the final month before the event, participants are encouraged to secure their place and be part of this important gathering.

Registration is now open:

<https://nige.org.ng/conference>

AYGEC26 represents a valuable opportunity to connect, learn, and contribute to the advancement of geotechnical en-

gineering in a rapidly developing region.

We look forward to welcoming participants to Lagos for this inspiring event.

Opening of ICSE-13 website

Shinji Sassa / [TC213](#) / 27-03-2026

The website of the 13th International Conference on Scour and Erosion (ICSE-13) is now open at [ICSE 13 13th International Conference on Scour and Erosion 2027](#)

ISSMGE Lifetime Achievement Medal - Last Call for the 2026 Nominations

ISSMGE IT Administrator / General / 31-03-2026

ISSMGE, by its Awards committee (AWAC), had announced here the [call for nominations for this year's ISSMGE Lifetime Achievement Medal](#).

Nominations are made by the national societies of 91 country members.

The door is open till mid April, 2026.

The ISSMGE Lifetime achievement medal is probably the most prestigious international award in geotechnical engineering. All regions are encouraged to nominate their candidates.



<https://issmge-e.eu>

“Strengthening Geotechnics for a Sustainable Europe”

Four years in review: the European Council Report for Vienna 2026

As his term as Vice President for Europe draws to a close, Professor Lyesse Laloui has prepared his Council Report for the ISSMGE Council Meeting in Vienna 2026. Covering the

full breadth of European regional activity since the Sydney Council Meeting in 2022, the report reflects on four years of engagement with the European geotechnical community. We invite you to read it below.

COUNCIL REPORT / VIENNA 2026

Four Years in Review: Europe, 2022–2026

A summary of European regional activity presented to the ISSMGE Council Meeting, Vienna 2026.

ISSMGE Council Meeting, Vienna 2026

Appendix: Council Report for Europe Rapport du Conseil pour l'Europe

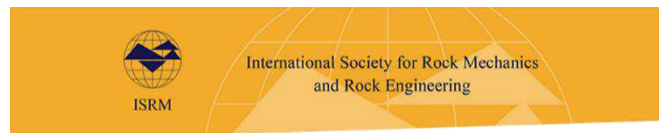
Lyesse Laloui École Polytechnique Fédérale de Lausanne (EPFL), Switzerland lyesse.laloui@epfl.ch

SUMMARY: This report contains an overview of the state of ISSMGE in Europe and a summary of the main activities in the region since the Council Meeting held in Sydney in May 2022.

https://issmge-e.eu/data/files/issmge_vp_europe_report_vienna2026_v3.pdf

ICSMGE 2026

The International Conference on Soil Mechanics and Geotechnical Engineering (ICSMGE 2026), the flagship event of ISSMGE, will take place in Vienna, Austria, from June 14–19, 2026. Marking the 100th anniversary of Karl Terzaghi's seminal work.



News

<https://www.isrm.net>

10th Conference of the Croatian Geotechnical Society: Geotechnical Engineering in Soft Rocks and Heterogeneous Rock Masses—an ISRM Specialized Conference. Abstract submission is now open 2026-03-05

The 10th Conference of the Croatian Geotechnical Society: Geotechnical Engineering in Soft Rocks and Heterogeneous Rock Masses—an ISRM Specialized Conference—will take place in Split, Croatia, 12–14 November 2026. Abstract submission is now open.

Please [download](#) the official First Announcement, where you can find all the key information about the conference. For additional details, please visit <https://www.hgd-cgs.hr/> or contact the organising committee at SPLIT.2026.HGD@gmail.com.

53rd ISRM Online Lecture will be given by Dr Mark Diederichs from Canada on 19 March, at 10:00 UTC 2026-03-09

The 53rd ISRM Online Lecture will be given by Dr Mark Diederichs, from Canada, and the title is "**Putting Geology Back in the Numbers – The Role of Engineering Geology in Rock Engineering and Risk Mitigation**". Go to <https://isrm.net/page/show/1104> to know more.

3rd National Symposium on Geotechnical Engineering to be held by Morocco 2026-03-10

The Comité Marocain de Mécanique des Sols et de Géotechnique (CMMMSG) will hold the 3rd National Symposium on Geotechnical Engineering "*Géotechnique durable et résilience des infrastructures face aux aléas naturels et anthropiques*".

The conference will take place in Marrakech, from 8 to 10 December 2026 and will address strategic issues in an integrated manner, including the design and securing of major works and infrastructures in complex environments, the resilience of infrastructures to climatic and seismic hazards, the contribution of innovative materials and techniques, as well as the use of advanced monitoring, digital modeling and artificial intelligence tools.

[Click here for the conference flyer](#)

[Click here for the registration form](#)

53rd ISRM Online Lecture by Dr Mark Diederichs (Canada) is now online 2026-03-19

You can now watch the 53rd ISRM Online Lecture by Dr Mark Diederichs with the title "Putting Geology Back in the Numbers – The Role of Engineering Geology in Rock Engineering and Risk Mitigation".

ISRM 2025 News Journal is now online 2026-03-27

The 2025 issue, volume 28, of the ISRM News Journal is now online on the ISRM website. Since 2012 the ISRM distributes the News Journal to all members in electronic version, and prints copies which are available at our sponsored symposia.

The News Journal includes news from the Society life, including board and regional reports, commission work, conference and symposia reports and papers from awarded members, among other content. [Click here to read it directly on our website or to download it.](#)

19th ISRM Young Members' Seminar Series on March 31st 2026-03-27

The next ISRM Young Members' Seminar will take place on 31 March 2026 at 9:00 PM (GMT). The seminar will feature expert presentations on tunnel digital twins, carbon storage, experimental rock mass behaviour and soft rock masses. Registration is free—[please register in advance to secure your place.](#)



News

<https://about.ita-aites.org/ita-news/ita-news>

ITACET Lunchtime Lecture Series #55 26 March 2026

We are excited to invite you to the next episode of the Lunchtime Lecture series, featuring a fascinating topic: "**Immersed Tunnels as an Innovative Solution**", organized in collaboration with ITA-AITES Working Group 11.

What's on the agenda:

- Introduction to immersed tunnels – Marcel 't Hart
- First immersed tunnel in the Middle East; Khor Al-Zubair tunnel – Martijn Smitt
- Weserquerung, a challenging river crossing – Jens Clausen

Join us to hear from experts, learn best practices, and participate in a live Q&A session.

- Date: April 14, 2026
- Time: 13:00 CET

Registration : [Lunchtime lecture series#55 - ITACET](#)

Even if you can't attend live, register anyway to receive a free streaming link available for 4 weeks.



Workshop

Design of Timber Headings

Thursday, 19th March 2026, 15:00 - 17:00 GMT
ICE QH, One Great George Street, London, SW1P 3AA
In Person

Event Information

This workshop will be led by Phil Astle – Chief Engineer & Engineering Excellence Director, OTB Engineering.

This BTSYM workshop will cover the Design of Timber Headings. Including:

1. Introduction to Timber Headings and its components
2. Defining load cases and overburden
3. Design of simple Timber Headings
4. Compliance with Eurocodes

5. Design of complicated structures and connections



About Phil

Phil Astle has been the Chief Engineer and Engineering Excellence Director for OTB since June 2014. Phil has more than 38 years' experience in geotechnical and civil engineering design and construction both in the UK and overseas. He is widely known for his experience in the leading the design of tunnels and underground structures and his expertise using SCL/NATM techniques, pre-cast segmental linings in concrete and SGI plus timber/square works. In addition, he is an accomplished designer of permanent and temporary works, familiar with design in steel, reinforced and unreinforced concrete, timber and composites, including fibre reinforced concrete.

Kind Regards,
BTS Young Members Committee

[Registration Link](#)



www.geosyntheticssociety.org

News

[Company History: Strata](#) March 2, 2026

This article is part of a Premium Corporate Member Spotlight, providing Premium Corporate Members with the opportunity to showcase their history, work and products. It [Read More »](#)

[An Interview with Gautam Dalmia, CDO at Strata Geosystems](#) March 3, 2026

This article is part of a Premium Corporate Member Spotlight, providing Premium Corporate Members with the opportunity to showcase their history, work and products. It [Read More »](#)

[Strata Geosystems and Venus Interlinings: Strategic Partnership](#) March 4, 2026

This article is part of a Premium Corporate Member spotlight, providing Premium Corporate Members with the opportunity

to showcase their history, work and products. It [Read More »](#)

[Strata Geosystems Case study: Valencia Landfill](#) March 4, 2026

This article is part of a Premium Corporate Member spotlight, providing Premium Corporate Members with the opportunity to showcase their history, work and products. It [Read More »](#)

[Solmax Case study: NJDOT utilizes GEOTUBE dewatering containers to restore channels to navigable depths](#) March 9, 2026

This article is part of a Premium Corporate Member spotlight, providing Premium Corporate Members with the opportunity to showcase their history, work and products. It [Read More »](#)

[Call for Bids: Hosting the GeoEng 2030 Conference](#) March 11, 2026

The Federation of International Geo-Engineering Societies (FedIGS) is inviting bids from member societies to host the inaugural GeoEng 2030 Conference, planned for the third quarter [Read More »](#)

[IGS Foundation Supercharges Fundraising Strategy With Key Appointment](#) March 12, 2026

Education opportunities in the geosynthetics industry are set to be boosted with the launch of an exciting new partnership. The IGS Foundation (IGSF), established to [Read More »](#)

[Did You Know? Geosynthetics make significant contributions to the UN Sustainable Development Goals](#) March 19, 2026

The United Nations' 17 Sustainable Development Goals (SDG) is a call for action for countries to unite to improve lives and protect the environment. Its [Read More »](#)

[Did You Know? Geosynthetics can reduce the use of aggregates in infrastructure construction by 50% and up to 90% in some cases](#) March 24, 2026

Geosynthetics have been used in the construction of infrastructure for decades but their potential, in terms of the sustainable benefit, is not being realized. Most [Read More »](#)

[Learn How to Attract Diverse Talent at the 13ICG Session](#) March 27, 2026

Approaches to creating a more diverse workplace will be shared by the IGS Diversity Committee (DC) at the 13th International Conference on Geosynthetics (13ICG). Attracting [Read More »](#)

[Did You Know? Geosynthetics help protect the environment from landfill waste contamination?](#) March 30, 2026

The world creates more than two billion tonnes of municipal solid waste a year with at least a third of that not managed in an [Read More »](#)

[13ICG Machine Learning Course Just \\$50 For IGS Young Members](#) March 30, 2026

Learn how to apply artificial intelligence to real-world geosynthetics challenges at an unmissable short course at the 13th International Conference on Geosynthetics (13ICG). Organized by [Read More »](#)





News

www.britishgeotech.org/news

Marina Schnaider Bortolotto Wins 57th Cooling Prize Competition 01.03.2026

The British Geotechnical Association (BGA) is pleased to announce that Alex Swallow, of the University of Oxford, has won the 56th Cooling Prize for his outstanding presentation, titled: 'Grout Injection in Open Caisson Construction'. [Read More](#)

The April 2026 issue of Ground Engineering is available online 10.03.2026

The December 2025 issue of Ground Engineering is available on line. Online access to Ground Engineering (GE) is included in BGA subscriptions. [Read More](#)

WiGeotech 2026: A Landmark Celebration of Inclusion and Inspiration in Geotechnics 10.03.2026

The inaugural Women in Geotechnics (WiGeotech) Afternoon Tea, hosted by the British Geotechnical Association (BGA). [Read More](#)

BGA Supports GE Sustainability & Resilience 2026 10.03.2026

The BGA Supports GE Sustainability & Resilience 2026 – The Green Print for a Sustainable Future [Read More](#)

Call for Nominations for the BGA Executive Committee 2026 18.03.2026

The British Geotechnical Association (BGA) is calling for nominations for members to stand for election to the BGA Executive Committee. Deadline 18 April 2025 [Read More](#)

BGA Supports Inspiring Women in Construction and Engineering 2026 18.03.2026

The British Geotechnical Association (BGA) is pleased to support Inspiring Women in Construction and Engineering (IWCE) 2026 as a partner. [Read More](#)

State of the Industry: Ground Investigation- Survey 18.03.2026

The British Geotechnical Association (BGA) is carrying out a survey of members and non-members at the Rankine Lecture event on 21 March 2018 [Read More](#)

Professor Charles Ng announced as 65th Rankine Lecturer 19.03.2026

The British Geotechnical Association (BGA) is pleased to announce that the 65th Rankine Lecture will be delivered by Professor Charles Ng of the Hong Kong University of Science & Technology (HKUST). [Read More](#)

Call for Abstracts: 18th Young Geotechnical Engineers Symposium 2026 (YGES 2026) 19.03.2026

The 18th BGA Young Geotechnical Engineers Symposium will take place at Imperial College London. [Read More](#)



News

www.geoinstitute.org/news

DIGGS Version 3.0 Released: Enhanced Capabilities for Geotechnical Data Exchange

Created: 30 Mar 2026



The DIGGS Technical Committee is pleased to announce the release of DIGGS v3.0, bringing significant enhancements to the geotechnical data exchange format. This new version introduces important improvements to interoperability, expanded capabilities for specialized applications, and a streamlined architecture that will benefit both software developers and end users.

(το πλήρες κείμενο του άρθρου δίνεται στην ενότητα ΑΡΘΡΑ)



ICOLD European Club (EURCOLD)



Dear EURCOLD Members and Colleagues

Europe is home to over 8000 large dams holding more than 450 billion m3 of water. These infrastructure play a crucial role in water management, energy production, irrigation, flood mitigation, drinking water and climate change resilience.

We are pleased to announce the Dams and Reservoirs Day 2026. This day is an annual celebration established by EURCOLD (ICOLD European Club) and held in May. The initiative was launched by the Italian Committee on Large Dams (ITCOLD) to advocate for and recognize contributions to promote knowledge about the role of dams, reservoirs, tailing dams, and levees in economic, social, and environmental contexts. The event was first celebrated on May 29, 2024, under the motto "Dam Day: Reservoirs for Europe".

This year, the third celebration will take place on May 24, 2026 with active participation of EURCOLD member countries. The focal theme for this year will be about "**Securing water Resilience for Europe**".

This message highlights the critical importance of ensuring the safety, sustainability, and reliability of water resources and infrastructure across Europe. In line with this theme, the main objectives for the Dams and Reservoirs Day 2026 includes:

- Addressing challenges in water management and reservoir operation across Europe- promoting best practices and knowledge sharing;
- Enhancing dam safety and resilience to ensure the long-term sustainability of Europe's water infrastructure,
- Promoting flexibility and adaption of water infrastructure in response to climate change impacts,
- Raising public awareness about the crucial role of dams, reservoirs, and levees for water resilience,
- Educating children, young people, and local communities on dams, reservoirs and levees, valuable contributions towards sustainable social development and prosperity. Providing students and young professionals with information on job opportunities in the sector,
- Promoting interactions between professionals and administrative bodies. Encouraging cooperation among stakeholders to strengthen European water security.

Dams and Reservoirs Day 2026 is celebrated across Europe with various events that showcase the crucial role of these infrastructures. The event highlights their resilience and adaptability to climate change extremes—such as floods and droughts—while addressing the growing demand for potable water, energy production, and irrigation. Related activities may also take place in the days leading up to or following the official celebration day.

EURCOLD will actively support and encourage all European National Committees to organise activities within the framework of this important event, such as Site visits to dams and reservoirs, Workshops with young engineers and students in cooperation with universities, photo competitions or others, promoting the dam and reservoir sector, and meetings of the dam engineering community with governing, legislative and decision making bodies, etc

Events at the national level are coordinated by the European National Committees.

EURCOLD organizes activities and works closely with National Committees to enhance engagement, ensure synchronization, and promote the main objectives of Dams and Reservoirs Day 2026.

Furthermore, EURCOLD will also plan activities and promote the European dam sector during the ICOLD Annual meeting in Guadalajara, Mexico, in the last week of May 2026.

We invite all European members and Committees to actively participate in this Initiative and contribute to strengthening water resilience across Europe.

With Respect

Arjan JOVANI
President of EURCOLD

Alfredo GRANADOS
General Secretary of EURCOLD



Event by SECED
Wed, Mar 25, 2026, 8:00 PM - 9:00 PM Online

Borehole seismometer installation at Bradwell B for enhanced earthquake

About

Synopsis

Earthquake recordings are of great benefit to support site-specific seismic hazard assessments for critical infrastructure but can also bring broader benefits when the seismometer installations are integrated into the wider national seismic monitoring network. This presentation describes the planning, deployment and operation of a string of seismic sensors in a single borehole at the proposed Bradwell B nuclear power station site in November 2018 and how the data captured has been used to enhance earthquake detection as part of the BGS national seismic network and for site characterisation for a probabilistic seismic hazard analysis (PSHA) undertaken by Jacobs.

In the first part of the talk, Iain Tromans (Jacobs) sets out the benefits of on-site earthquake monitoring for nuclear facilities, with reference to regulatory guidelines from IAEA and ONR, focusing on the reduction of uncertainties in the inputs to PSHA.

David Hawthorn (BGS) covers the technical and logistical aspects of the deployment and operation of the Bradwell borehole seismometer array, as well as integration with the wider national seismic monitoring network. Such integration enhances local earthquake detection as well as helping with the

operation and validation of the monitoring station itself. The potential future use of the monitoring equipment, and others like it, are also examined in terms of their benefits over the operation life of a nuclear facility.

[up-join&deeplinkId=1b5bb4ad-2e5c-4f39-8e4f-620556e513ac&directDl=true&msLaunch=true&enableMobilePage=true&suppressPrompt=true](https://teams.microsoft.com/join/1b5bb4ad-2e5c-4f39-8e4f-620556e513ac?directDl=true&msLaunch=true&enableMobilePage=true&suppressPrompt=true)

Angeliki Lessi-Cheimariou presents how weak-motion records collected over an 18-month period were used in the development of various aspects of the PSHA model, including the spectral decay parameter, kappa, the vertical/horizontal (V/H) response spectral ratios and site amplification. Angeliki will focus on how use of site-specific weak-motion data helped reduce the uncertainties associated with the site's eigenfrequencies, ultimately providing greater confidence in the modelling of site-effects within the PSHA.

About the speakers

Dr Iain Tromans' career in earthquake engineering began with a PhD at Imperial College, investigating factors influencing the distribution of damage to buried infrastructure, based on fieldwork following the devastating earthquakes in Turkey in 1999. Iain has spent the past 22 years in engineering consultancy, being heavily involved in seismic hazard assessments for critical infrastructure, with a particular emphasis on nuclear facilities. Dr Tromans was closely involved in all aspects of the delivery of site-specific PSHAs at Hinkley Point C, Sizewell C and Bradwell B, as the lead of the Technical Integration team. As Head of Technology for Seismic Geotechnics at Jacobs, Dr Tromans provides technical leadership in the development and application of novel solutions in geotechnical earthquake engineering and engineering seismology for clients spanning the energy, defence, transportation, maritime, water and urban sectors.

Dr David Hawthorn is a Seismologist with the British Geological Survey. His current work is strongly focused on the management of the UK's permanent national network of around 70 seismic monitoring stations, as well as smaller temporary networks deployed to achieve more specific goals (baseline seismicity surveys, enhanced detection thresholds etc.). His work also involves operating several site-specific seismic stations at nuclear licensed sites and dams, which are integrated with the wider seismic network. He has been working in the field of passive seismology since 2007 for both academic and governmental organisations. His work has included after-shock studies following large damaging earthquakes (Indonesia in 2008, Chile in 2010 and Indonesia in 2018), tracking volcanic activity in Iceland, monitoring Hydraulic fracturing of shale gas in Lancashire (2018) and earthquake swarms in Surrey (2019).

Dr Angeliki Lessi-Cheimariou is a senior earthquake engineering specialist with over sixteen years of experience in site response analysis and site characterisation. She led these aspects for the site-specific probabilistic seismic hazard analyses undertaken by Jacobs for major nuclear infrastructure projects, including Hinkley Point C, Sizewell C, and Bradwell B. Her expertise extends across the broader geotechnical and earthquake engineering fields. Throughout her professional career she has made use of innovative approaches in site response analysis which were originally explored during her PhD at Imperial College London, and which have helped provide robust, safety-critical solutions for large-scale infrastructure.

Event link <https://teams.microsoft.com/join/1b5bb4ad-2e5c-4f39-8e4f-620556e513ac?directDl=true&msLaunch=true&enableMobilePage=true&suppressPrompt=true>

ΔΙΑΚΡΙΣΕΙΣ ΕΛΛΗΝΩΝ ΓΕΩΤΕΧΝΙΚΩΝ ΜΗΧΑΝΙΚΩΝ

Άννα Αθανασοπούλου - Ζέκκου
2026 USUCGER Diversity, Equity and Inclusion
Award recipient



It was an honor to receive the 2026 USUCGER [#Diversity](#) [#Equity](#) and [#Inclusion](#) Award during the annual meeting at [#Geocongress2026](#)! I am incredibly thankful to everyone who has supported this work throughout my years as a student and as a faculty member. I hope the efforts towards making sure everyone feels like they belong in our field never stop so that we may continue to benefit from the creativity, brilliance and dedication of everyone in our community!! [UC Berkeley GeoSystems Group](#)



Κατερίνα Ζιωτοπούλου
Board-Certified Geotechnical Engineer (BC. GE)



Congratulations to [Katerina Ziotopoulou](#), Ph.D., P.E., BC. GE for achieving her Board-Certified Geotechnical Engineer (BC. GE) [hashtag#boardcertification](#), the highest post-licensure board certification in geotechnical engineering. Dr. Ziotopoulou was board-certified for her advanced expertise and experience, education, and attainment of specialized body of knowledge in geotechnical engineering.

Dr. Ziotopoulou is a Professor in Civil and Environmental Engineering at the **University of California, Davis**. Prior to joining UC Davis, she served on the faculty at **Virginia Tech**. Dr. Ziotopoulou specializes in geotechnical earthquake engineering with an emphasis on investigating ground failure due to earthquake-induced liquefaction and cyclic softening, and its mitigation. She is a faculty advisor in the **UC Davis Center for Geotechnical Modeling**, a national shared-used centrifuge facility under NHERI (Natural Hazards Engineering Research Infrastructure). Dr. Ziotopoulou's research has significantly impacted both research and practice and have been adopted in hundreds of projects worldwide.

Dr. Ziotopoulou has been the recipient of notable awards such as the ASCE 2021 Arthur Casagrande Professional Development Award, National Science Foundation CAREER Award, the 2024 International Society of Soil Mechanics and Geotechnical Engineering's TC203 Young Researcher Award, and the 2024 U.S. Universities Council on Geotechnical Education & Research (USUCGER) Early Career Educator Award.



Katerina received her B.S. in civil engineering from the **National Technical University of Athens**, and her M.S. and Ph.D. in civil engineering from UC Davis. She serves as an Associate Editor of the **ASCE Journal of Geotechnical and Geoenvironmental Engineering**; an Editorial Board Member of **Computers and Geotechnics** and the **Canadian Geotechnical Journal**; and the Advisory Board of the **NHERI DesignSafe** Cyberinfrastructure. Katerina served on the Organizing Committee of the 2022 Geo Congress and as the Technical Co-Chair of the 2024 Geo Congress. She currently serves on the Governing Board of the **Geo-Institute of ASCE**, the Soil Dynamics and Earthquake Engineering Committee, and the Innovative Technologies and Tools in Geotechnical Engineering Committee. She is a licensed professional engineer in California.

ΠΡΟΣΕΧΕΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΚΔΗΛΩΣΕΙΣ



European Geosciences Union
3–8 May 2026 Vienna, Austria & Online

Session ITS4.29/NH13.15 Advances in Landslide Investigation and Mitigation: Bridging Research and Engineering Geology Practice

www.egu26.eu/session/57553

Για τις παλαιότερες καταχωρήσεις περισσότερες πληροφορίες μπορούν να αναζητηθούν στα προηγούμενα τεύχη του «περιοδικού» και στις παρατιθέμενες ιστοσελίδες.

Sixth International Conference on Geotechnical Engineering – Iraq (6ICGE-Iraq 2026), April 8–9, 2026, Baghdad, Iraq, <https://icge-iraq.uobaghdad.edu.iq/>

3rd International Conference on Advances in Rock Mechanics (TuniRock 2026), 09–12 April, 2026, www.tunirock2026.com

International Conference on Geotechnics, Civil Engineering and Structures (CIGOS) 2026 Innovation in Planning, Design and Civil Infrastructure for Resilient and Sustainable Transformation, April 16 & 17, 2026, Ho Chi Minh City, Vietnam <https://cigos2026.sciencesconf.org>



21ST PIPELINE
TECHNOLOGY
CONFERENCE

27-30 APRIL 2026, BERLIN

www.pipeline-conference.com

The 21st Pipeline Technology Conference (ptc) takes place in Berlin from 27-30 April 2026. Europe's premier conference and exhibition for pipeline industry professionals will offer a look into the pipeline future, with a broad range of 1-day training courses, panel discussions, technical sessions, operator round-tables, award ceremonies and social events.

ptc 2026 brings together the industry elite – pipeline operators, industry leaders, experts, and young talent – to discuss the latest developments and advancements in pipeline technology on a global stage.



LANDSLIDES 2026 Landslide Geo-Education and Risk (LAGER), 27 April - 1 May 2026, Queenstown, New Zealand <http://landsliderisk.nz>



Over the past few decades, landslide research has expanded considerably, producing a wealth of scientific insights. Our understanding of slope failure processes has advanced significantly, yet it remains unclear how effectively engineering geologists and geotechnical engineers focused on slope stabilization and landslide risk reduction are translating this knowledge into practice.

This session aims to bring together researchers and practitioners from diverse backgrounds to:

1. Foster collaboration and networking across disciplinary boundaries
2. Encourage the exchange of theoretical insights and practical approaches to landslide investigation and mitigation
3. Promote more efficient use of limited resources for landslide risk reduction

We particularly welcome contributions on topics such as:

- Expanding the affordable use of innovative technologies for landslide detection and mapping (e.g., optical and radar satellite remote sensing)
- Advances in subsurface characterization using customized geophysical methods (e.g., electrical resistivity, seismic tomography)
- Integration of remote sensing and ground-based data for improved landslide monitoring
- Engineering geological models as integrative tools for site-specific landslide risk mitigation
- Data availability, quality issues, and handling geological uncertainty in slope stability modeling
- Approaches to slope stability analysis, from empirical methods to advanced numerical models
- Impacts of climate variability on landslide occurrence and engineered slope performance
- Low-cost, reconnaissance-level hazard assessments in data-scarce or disaster-affected regions (e.g., co- and post-seismic landslide events)
- Case histories of slope stabilization and landslide mitigation - including both successful and unsuccessful interventions - to highlight the limitations of "one-size-fits-all" solutions
- Knowledge transfer between scientists and engineers, and effective communication of landslide risk to civil protection authorities, policymakers, media, and the general public

Session sponsored by the International Association of Engineering Geology and the Environment (IAEG – <https://iaeg.info>)



DFUI Deep Foundations & Underground Infrastructure Setting the Benchmark for Geotechnical Excellence in the Middle East, 4 - 5 May 2026, Dubai, UAE <https://deepfoundationsmena.com>

15th International Conference "Modern Building Materials, Structures and Techniques", May 12-15, 2026, Vilnius, Lithuania, <https://vilniustech.lt/332107>

ITA-AITES WTC 2026 World Tunnel Congress, May 15 to 21, 2026, in Montreal, Quebec, Canada, <https://wtc2026.ca>

94th Annual Meeting & International Symposium on Large Dams - Water, Energy and Society: The Evolving Role of Dams in a Changing World, May 21 to 29, 2026, Guadalajara, Mexico, www.icoldmexico2026.com

Summer School on AI Tools for Structural and Earthquake Engineering, June 1st - 5th 2026. Guimarães, Portugal, sec.estructuras@civil.uminho.pt

ICPMG 2026 Physical Modelling in Geotechnics, 8-12 June 2026, ETH Zürich, Switzerland, <https://tc104-issmge.com/icpmg-2026>

8th International Young Geotechnical Engineers Conference - 8IYGEC, 11. - 14. June 2026, Graz, Austria, www.tugraz.at/institute/ibg/events/8iygrec

21st International Conference on Soil Mechanics and Geotechnical Engineering Geotechnical Challenges in a Changing Environment, 14 - 19 June 2026, Vienna, Austria, www.icsmge2026.org/en

3rd International Geotechnical Innovation Conference - Shaping the World Beneath: Fostering Sustainability, Innovation and Resilience in Geotechnics, 15 - 16 June 2026, Jeddah, Saudi Arabia, <https://geotechnicalinnovationconference.com> Email info@creativeconnectionevents.com

ICONHIC 2026 International Conference on Natural Hazards & Infrastructure, 29 June - 2 July 2026, Chania, Greece <https://iconhic.com/2026>

Summer School - Numerical Modelling in Geotechnical Engineering, 06 - 10 July 2026, Innsbruck, Austria, www.uibk.ac.at/en/weiterbildung/numerische-modellierung



**Second ISRM Commission Conference on
Estimation of Rock Mass Strength and
Deformability
July 10, 2026, Colombo, Sri Lanka
www.slrmes.org**

The Sri Lankan Rock Mechanics and Engineering Society (SLRMES) invites you to participate in the Second ISRM Commission Conference on Estimation of Rock Mass Strength and Deformability to be held in Colombo, Sri Lanka on July 10, 2026. The main purpose of the conference is to compile and present the current status of the procedures available to estimate rock mass strength and deformability.

Most naturally occurring discontinuous rock masses comprise intact rock interspaced with different types of discontinuities. Fissures, fractures, joints, faults, bedding planes, folds, shear zones, and dykes are different types of discontinuities that exist in rock masses. Discontinuities may be divided into major and minor using the feature size. Large features may be

considered as major discontinuities, and the rest of the small features may be considered as minor discontinuities. For most of the civil and mining engineering projects, at the uppermost level (for the domain size considered for analysis), rock masses contain only a few major discontinuities. For such rock engineering projects, major discontinuities may be considered as single features, and their geometry may be represented deterministically. On the other hand, due to their large number and inherent statistical nature, the geometry of minor discontinuities should be characterized probabilistically. Henceforth, the minor discontinuities are referred to as either "joints" or "fractures" in this document. It is a well-known fact that the intact rock mechanical properties estimated at the laboratory level do not reflect the in-situ jointed rock mass mechanical properties at the project level. Rock mass strength and deformability depend on the (a) lithology & alteration, (b) geo-mechanical properties of the intact rock, (c) discontinuity geometry network including the number of discontinuity sets, their intensity, the spatial distribution of orientation, size, and spacing, (d) geo-mechanical properties of the discontinuities including roughness, strength and deformation of asperities and filling material, (e) in-situ stress system, (f) size of the rock mass relative to the size and intensity of the fractures (leading to scale effects), (g) shape of the rock mass (h) loading/unloading stress path, (i) loading rate, (j) pore pressure in the rock mass and (k) environmental conditions (such as the temperature, humidity etc.) of the rock mass. The presence of complicated fracture networks, the inherent statistical nature of their geometrical parameters, and the variabilities and uncertainties involved in the estimation of their geometrical and geo-mechanical properties and in-situ stress make accurate prediction of rock mass strength and deformability a very difficult, and challenging task. On the other hand, understanding the mechanical behaviour of rock masses is crucial in designing safe and economical rock engineering structures in or on rock masses.

The strength and deformability of rock masses show a very significant scale effect and anisotropic behaviour at the three-dimensional (3-D) level due to the pre-existing fracture system. It has been a great challenge for the rock mechanics and rock engineering profession to predict rock mass strength and deformability in 3-D which incorporates the effect of important fracture geometry, relevant intact rock and fracture mechanical parameters, and intermediate principal stress and to capture the scale effects and anisotropic properties of jointed rock masses. Various procedures that belong to the following three groups have been suggested in the literature to estimate rock mass strength and deformability: (a) Based on empirical methods that use one or several rock mass classification systems; (b) Based on numerical modelling and (c) Based on back-calculation methods using field monitored data. The main goals of this conference are to provide a critical review of the said available methods, to provide guidelines for rock mechanics teaching, to suggest future research to improve the available techniques in predicting rock mass strength and deformability properties, and to recommend the best techniques to apply in rock engineering practice to improve the prediction of rock mass mechanical behaviour in field problems associated with mining, civil geotechnical, geological, and petroleum engineering.

The conference will cover advances in all the aforementioned areas of rock mechanics and rock engineering encompassing the fields of mining, civil, geological, and petroleum engineering, and geophysics focusing on the theme "Estimation of Rock Mass Strength and Deformability Including the Associated Components and Applications". Each session is expected to start with a Session Lead Lecture given by an expert on the session topic. The technical lectures and trade exhibition programs are organized to provide conference supporters maximum exposure and interaction with participants from universities, industry, government, and exhibitors.

Sri Lanka has been crowned the most beautiful island in the world, taking the top spot on the list of "The 50 Best Islands in the World" compiled by global travel site Big 7 Travel. According to Big 7 Travel, Sri Lanka was chosen for the top spot for its rich blend of cultural heritage, diverse landscapes, and pristine beaches. The list also praised the island nation for its unique wildlife, ancient temples, lush tea plantations, and vibrant local experiences.

Information on the conference is available on the website: <https://www.slrmes.org>. Further details on the technical part of the conference and the Exhibitor and Sponsorship Programs can be obtained by contacting Prof. Pinnaduwa H.S.W. Kulatilake (kulatila@arizona.edu), Conference Chair. Information on the management of the non-technical part of the conference can be obtained by contacting Mrs. Sujeewa N. Kulatilake (sujeewa_nishanthi@yahoo.com), Executive Manager.

We look forward to seeing you in beautiful, breathtaking Sri Lanka in July 2026.

Topics Covered in the Conference

The conference will cover advances in all the below-mentioned areas of rock mechanics and rock engineering encompassing the fields of mining, civil, geological, and petroleum engineering, and geophysics focusing on the theme "Estimation of Rock Mass Strength and Deformability Including the Associated Components".

Topical Areas

- Intact rock mechanical properties
- Rock mass fracture system characterization and modeling
- Rock joint mechanical properties
- In-situ stress measurement and estimation
- Empirical methods to estimate rock mass mechanical properties
- Numerical methods to estimate rock mass mechanical properties
- Effect of in-situ stress on rock mass mechanical property estimation
- Field monitoring of rock mass mechanical behaviour
- Back calculation of rock mass mechanical properties using field-monitored rock mass mechanical behaviour data
- Geophysical technics for estimation of rock mass mechanical properties
- Variability and uncertainty of estimated rock mass mechanical properties
- Effect of rock mass mechanical properties on underground rock mass stability
- Effect of rock mass mechanical properties on tunnel stability
- Effect of rock mass mechanical properties on foundation stability
- Effect of rock mass mechanical properties on dam stability
- Effect of rock mass mechanical properties on rock slope stability
- Effect of rock mass mechanical properties on open-pit mine stability
- Effect of rock mass mechanical properties on borehole stability

Please contact the following to obtain information on conference technical program:

Prof. Pinnaduwa H.S.W. Kulatilake

Emeritus Professor
Department of Mining & Geological Engineering
University of Arizona, Tucson, AZ, USA.

Conference Chair and President, SLRMES

Email Address: kulatila@arizona.edu



International Summer School "Risk Management of Monuments subjected to Geohazards and Climate Change", 20 - 24 July 2026, Karlovasi, Samos, Greece, www.edusamos.gr

ISFMG 2026 12th International Symposium on Field Monitoring in Geomechanics, 06 -10 August 2026, Indian Institute of Technology Indore, India, <https://sites.google.com/view/isfmq2026/home>



<https://dfi-events.org/s3-26>

Join us for DFI S3: Slopes, Support, and Stabilization, a dynamic 2.5-day conference dedicated to the practical application of deep foundation and ground improvement solutions. This event focuses on techniques for stabilizing soft ground, landslides, and slopes, as well as supporting deep excavations.



CAVING 2026

11-13 August 2026, Ulaanbaatar, Mongolia

www.acgcaving.com

The Block and Sublevel Caving Conferences provide a platform for mining companies to be kept informed of the latest technological developments and caving research carried out by industry and academia. The Australian Centre for Geomechanics, a not-for-profit mining research organisation at The University of Western Australia, looks forward to hosting Caving 2026 in Mongolia.

This follows previous events held in Cape Town, 2007; Perth, 2010; Santiago, 2014; Vancouver, 2018 and Adelaide in 2022.

Conference Themes

- Cave design and planning
- Cave fragmentation and flow

- Cave management and draw control
- Caving geomechanics
- Caving operations
- Geotechnical data and rock mass characterisation
- Instrumentation monitoring and data management
- Mine seismicity and inrush hazard
- Risk management and controls
- Rock mass preconditioning
- Subsidence

Contact Us

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Australian Centre for Geomechanics
The University of Western Australia
35 Stirling Highway (M600)
CRAWLEY, WA 6009 / AUSTRALIA



Soft Soils 2026 International Conference on Advances and Innovations in Soft Soil Engineering 2026, 24-26 August 2026, Delft, Netherlands <https://softsoils2026.dryfta.com>

ICGE Colombo 2026 4th International Conference on Geotechnical Engineering, 24-26 August 2026, Colombo, Sri Lanka, <https://icqecolombo2026.org/>

X Latin American Congress on Rock Mechanics 26 - 28 Aug, 2026, Brsasilia, Brazil, <https://larms2026.com>

CREST 2026 3rd International Conference on Construction Resources for Environmentally Sustainable Technologies, Sep 07-08, 2026, Cambridge, England-United Kingdom <https://engage-events.ifm.eng.cam.ac.uk/IC-CREST2026#/>

13 ICG - 13th International Conference on Geosynthetics (13 ICG), 13-17 September 2026, Montréal, Canada, www.13icg-montreal.org

Scientific Colloquium: Large Scale Testing 2026, 14-15 September 2026, Karlsruhe, Germany, www.ibf.kit.edu/908.php

Eurock 2026 Risk Management in Rock Engineering - an ISRM Regional Symposium, 15-19 September 2026, Skopje, Republic North Macedonia, <https://eurock2026.com>

ECEE2026 18th European Conference on Earthquake Engineering Shaping the Future of Earthquake Engineering, 14 - 1 September 2026, Berlin, Germany, <https://ecee2026.eu>

ISRM Regional Symposium – EU-ROCK 2026, September 15–19, 2026, in Skopje, N. Macedonia, <https://eurock2026.com>

4th International Symposium Preservation of Monuments & Historic Sites, 16 – 18 September 2026, Athens, Greece <https://tc301-athens.com>



CouFrac2026

**5th International Conference on
Coupled Processes in Fractured Geological Media:
Observation, Modeling, and Application**
20-23 September, 2026, Uppsala, Sweden
www.coufrac2026.com

Coupled thermal-hydro-mechanical-chemical (THMC) processes in fractured geological media are fundamental to understanding the Earth's evolution and essential to a wide range of near-surface and subsurface applications. These include, but are not limited to, carbon sequestration, geothermal energy, nuclear waste disposal, underground energy storage, hydrocarbon recovery, civil infrastructure development, groundwater management, and deep mining of critical minerals. To advance both scientific understanding and engineering practice, it is vital to integrate insights from numerical modelling, laboratory experiments, field observations, and increasingly, data-driven approaches such as machine learning. The interplay of THMC processes across scales continues to be a vibrant and growing area of interdisciplinary research, with broad implications for environmental stewardship, resource management, and hazard mitigation.

The 5th International Conference on Coupled Processes in Fractured Geological Media: Observation, Modeling, and Application (CouFrac2026) will be held in Uppsala, Sweden, on 20-23 September 2026. Following successful editions in Wuhan (2018), Seoul (2020), Berkeley (2022), and Kyoto (2024), CouFrac2026 will provide a dynamic platform for researchers, engineers, and practitioners to share recent advances, exchange ideas, and foster collaborations, in all areas of coupled processes associated with fractured geological media. The conference will cover a wide spectrum of topics, including fundamental process understanding, computational methods, in-situ testing, laboratory studies, and practical applications across geological environments ranging from the near-surface to the deep subsurface. The conference will be held in a face-to-face format only. We look forward to your participation!

Session Topics

1. Fracture propagation modeling in porous media (Convener: Keita Yoshioka, Wenzhuo Cao, and Chenxi Zhao)
2. Coupled processes in CO₂ and H₂ storage: from lab to field scale (Convener: Víctor Vilarrasa, Nicolas Espinoza, Roman Makhnenko, and Antonio Pio Rinaldi)
3. Coupled Processes in Deep Geothermal Energy Resource Exploration and Extraction (Convener: Ingrid Tomac, Inga Berre, Mohammadreza Jalali, and Ayman Abed)
4. Conditioning the Complexity: Data-Constrained, Statistically Coherent Fracture Modelling (Convener: Raymond Munier)
5. THM processes leading to deformation and fracturing of bedrock (Convener: Diego Mas Ivars)

6. Coupled THM hard rock fracture behaviour – laboratory experiments and numerical modelling (Convener: Diego Mas Ivars)
7. Coupled THM field experiments for the characterization of fractured hard rock (Convener: Diego Mas Ivars)
8. Coupled THMC behavior of multi-barrier systems for deep geological repositories (Convener: Ju Wang, Zhihong Zhao, and Xingguang Zhao)
9. Coupled Hydraulic-Mechanical-Chemical (HMC) Processes in Rock Fractures (Convener: Liangchao Zou, Jan-Olof Selroos, Diego Mas Ivars, Paolo Trinchero, and Bo Li)
10. Faults, Fluids, and Fractures: Coupled Processes in Mineral and Energy Systems (Convener: Thomas Poulet, Manolis Veveakis, Peter Kang, Jinhyun Choo, and Yinlin Ji)
11. Induced Seismicity in Geothermal Energy: From Surface to Source (Convener: Chongyuan Zhang, Ki-Bok Min, Fengshou Zhang, and Yusuke Mukuhira)
12. Coupled Processes in Clay-Rich Fractured Media (Convener: Christophe Tournassat)
13. Damage-induced coupled processes within fractured/porous rocks (Convener: Sho Ogata, Kazuhei Aoyagi, and Kazuki Sawayama)
14. Shear behavior of rock discontinuities under coupled THM processes (Convener: Li Zhuang and Lei Wang)
15. Chemo-Mechanical Processes in Fractured Rock (Convener: Carl Steefel)
16. Challenges in numerical modeling of coupled processes in Discrete Fracture Network (Convener: Maria Klepikova, Jeffrey Hyman, Bruno Figueiredo, and Silvia De Simone)
17. Coupled thermo-hydro-mechanical (THM) processes in fractured rocks (Convener: Maria Klepikova, Jeffrey Hyman, Bruno Figueiredo, and Silvia De Simone)
18. Development and evolution of flow paths in rock salt (Convener: Laura Blanco-Martín and Kyung Won Chang)
19. Linking Laboratory Insights to Field-Scale Predictions of Coupled HMC Processes in Fractured Media (Convener: Xiaoguang Wang and Chuanyin Jiang)
20. Reactive Transport Processes: Incorporating Pore-Scale Understanding into Field-Scale Applications (Convener: Sergi Molins and Cyprien Soulaire)
21. Coupled THMC-B processes in Underground Hydrogen Storage (Convener: Chaojie Cheng, Xianda Shen, Chaozhong Qin, and Fengshou Zhang)
22. Seismo-Hydro-Mechanical Coupling in Faulted Rocks: Advanced Laboratory and In Situ Experimental Insights (Convener: Rui Wu, Paul Antony Selvadurai, and Antonio Pio Rinaldi)
23. AI and Robotics Technologies for Geomechanics Exploration in Deep Earth and Deep Space (Convener: Xuhai Tang, Pengzhi Pan, Xiaoguang Wang, and Jiangmei Qiao)
24. Mechanisms, Modeling, and Engineering Optimization of CO₂ Geological Sequestration (Convener: Mengyi Li, Mengli Li, Zhijun Wu, and Fengshou Zhang)
25. Coupled processes in fractured rock under glacial cycles (Convener: Andrew Frampton, Jan-Olof Selroos, and Jens-Ove Näslund)
26. Evolving pore-fracture structure and fluid transport during in-situ modification of unconventional resource reservoirs (Convener: Weiguo Liang and Yuedu Chen)
27. Modeling of Strongly Coupled Flow and Geomechanics in Reservoir Engineering Problems: From Formulation to Field-Scale Simulation (Convener: Jihoon Kim, Baehyun Min, and Hyun Chul Yoon)
28. From Test to Analysis: In-situ Experiments and Numerical Modeling in Underground Rock Laboratories (Convener: Iman Vaezi, Andrés Alcolea, Mohammadreza Jalali, and Åsa Fransson)

Contact us

Local Organising Committee of CouFrac 2026

Qinghua Lei - Local Chair
 Chuanyin Jiang - Secretary General
 Iman Vaezi - Secretary General

Conference Secretariat

Academic Conferences
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2nd International Conference on Insitu Measurement of Soil Properties and Case Histories INSITU 2026, September 21 - 23, 2026, Bali, Indonesia <https://www.insitu2026.com/>

GEOTECH 2026, 01 October 2026, London, United Kingdom <https://geotech.geplus.co.uk/geotech2026/en/page/home>

6th International Conference on Information Technology in Geo-Engineering JTC2 Conference, 13-16 October 2026, Graz, Austria, www.icitg2026.com



Adapting to change ~ Embracing opportunities 14-16 October 2026, Bologna, Italy www.hydropower-dams.com/hydro-2026

Aqua-Media International is pleased to welcome the global hydropower and dams community to the elegant city of Bologna, Italy, on 14 - 16 October 2026, for three days of sessions, preceded by training workshops, and followed by technical tours. The elegant city of Bologna will provide a perfect backdrop for discussions on global issues: challenges and opportunities of the energy transition; new technology; AI; safety and risk; project finance; environmental protection; helping developing countries to unlock their hydro potential... and more

Topics to be Covered

- **Hydraulic machinery**
- **Operation and maintenance**
- **Powerplant uprating and refurbishment**
- **Pumped storage**
 Role and multiple benefits
 Potential and plans
 Technical innovation
 Economics and financing
 Case studies
- **Electrical engineering**
- **Hybrid schemes**
- **Climate**
- **Dam safety**

Innovation in monitoring systems
Upgrades to enhance safety
Learning from incidents and failures
Cyber and physical security

- **Spillways and gateworks**

Innovative spillway design
Upgrading spillway capacity
Gate design to enhance safety
Operation in extreme temperatures
Gate installation and repairs in challenging conditions

- **Civil engineering**

Innovative design
Construction techniques
On-site safety
Construction equipment

- **Hazard management**

Designing for resilience to natural disasters
Seismic design of dams
Geohazard management
Flood mitigation and management
Monitoring and early warning systems

- **Artificial intelligence**

The role of AI: from concept through to O&M
Multiple roles of BIM in design and construction
New applications of robotics/drones

- **Sedimentation management**

- **Materials: dams and foundations**

RCC dams
Geomembranes
Sustainable dams
Embankment dam research
Foundation treatment: case studies

- **Environment and social impacts**

- **Succession planning**

For any enquiries about the HYDRO 2026 conference programme, please contact us at: Hydro2026@hydropower-dams.com

For enquiries about the HYDRO 2026 Exhibition, please contact: Sales@hydropower-dams.com



EWRWSE – 2026 7th International Conference on Environmental Geotechnology, Recycled Waste Materials and Sustainable Engineering, 22-25 October 2026, Surat, Gujarat, India www.egrwse2026.com

SLOPE STABILITY 2026 Slope for Safety Performance an ISRM Specialized Conference, 26 – 29 October 2026, Lima, Peru www.slopestability2026.com/en

PBD-V Chile International Conference on Performance-Based Design in Earthquake Geotechnical Engineering, November 4th to 6th, 2026, Puerto Varas, Chile www.pbd-v-chile.com



**10th Conference of the Croatian Geotechnical Society:
Geotechnical Engineering in Soft Rocks and
Heterogeneous Rock Masses -
an ISRM Specialized Conference
12 - 14 Nov, 2026, Split, Croatia**

www.hgd-cgs.hr/?lang=en

Conference Topics

- engineering behaviour of soft rock and heterogeneous rock masses
- site investigation, testing and engineering geological models
- analysis and numerical modelling in soft rocks and complex ground
- slopes, excavations and ground stability in soft rocks and weathered rock masses
- underground structures and foundations in soft rocks and difficult ground conditions
- construction practice, monitoring, risk and case histories

DETAILS AND NEWS www.hgd-cgs.hr

CONTACT SPLIT.2026.HGD@gmail.com



ARMS 14 Fukuoka 2026 - 14th Asian Rock Mechanics Symposium Rock Mechanics for the Next Generation –Innovations, Sustainability, and Resilience – an ISRM Regional Symposium, 22-26 November 2026, Fukuoka, Japan, www.ec-convention.com/ARMS14/



**Theme: Landslide Science and Practice for Safe
and Resilient Communities**

23 – 27 Nov 2026, Amrita Vishwa Vidyapeetham, Faridabad, India

<https://wlf7.org>

The World Landslide Forums have been organized every three years since the first forum held in Tokyo, Japan, in 2008. They serve as a global platform for scientists, engineers, practitioners, and policymakers engaged in landslide disaster risk reduction to share knowledge, present scientific and technical advances, and strengthen international cooperation.

The 7th World Landslide Forum (WLF7) focuses on “Landslide Science and Practice for Safe and Resilient Communities” and will be held from 23–27 November 2026 at Amrita Vishwa Vidyapeetham, Faridabad, India. WLF7 contributes to major international and national commitments, including

- Kyoto Landslide Commitment 2020
- ISDR-ICL Sendai Partnerships 2015–2025
- Sendai Framework for Disaster Risk Reduction 2015–2030
- 2030 Agenda for Sustainable Development
- New Urban Agenda
- Paris Climate Agreement
- Government of India's 10-Point Agenda on Disaster Risk Reduction.

The aim of WLF7 is to foster effective collaboration among landslide researchers and practitioners to identify shared priorities and define coordinated actions for landslide risk reduction at global, regional, and local scales. The Forum will address key aspects of landslide science and practice, including landslide analysis, monitoring and early warning, modeling, hazard and risk assessment, mitigation strategies, triggering mechanisms, and the impacts of climate change. In line with the 2030 Agenda for Sustainable Development, WLF7 is committed to sustainability. The Forum will promote environmentally responsible practices, including reduced reliance on printed materials, with programme information and proceedings made available primarily in electronic format.

Thematic Areas

WLF7 addresses landslide risk reduction through integrated scientific, technical, and policy-oriented themes spanning hazard assessment, monitoring, mitigation, and governance.

- Theme 1. Reducing Landslide Disaster
- Theme 2. Remote Sensing, Site
- Theme 3. Testing, Modelling, and Mitigation Techniques
- Theme 4. Landslide Hazard Mapping, Risk Assessment and Management
- Theme 5. Progress in Landslide Science and Applications
- Theme 6. Regional Landslide Case Studies

Contact Us

Organising Secretariat, Amrita Vishwa Vidyapeetham, Faridabad Campus, Mata Amritanandamayi Marg Sector 88, Faridabad, Haryana 121002, India info@wlf7.org, programmes@wlf7.org Sponsorship sponsors@wlf7.org



GEOTEC HANOI 2026, The 6th International Conference on Geotechnics for Sustainable Infrastructure Development, November 26 - 27, 2026, Hanoi, Vietnam, <https://geotechn.vn/>

5th International Conference on TRANSDISCIPLINARY MULTISPECTRAL MODELLING AND COOPERATION FOR THE PRESERVATION OF CULTURAL HERITAGE Cultural heritage at the forefront of transformation, 14-16 December, Athens, Greece, www.tmm-ch.com

7th International Conference on Grouting and Deep Mixing, March 17 - 19, 2027 | Florence, Italy, <https://dfi-events.org/grout27/index.html>

GeoMandu 2027, 11th AYGEC and 1st SACG Mountain Geotechnics for Infrastructure Development Redefining Geotechnics for the Mountainous Landforms, 17–19 March 2027, Kathmandu, Nepal, <https://geomandu.ngeotechs.org>

IS-GI LYON 2026 International Symposium on Ground Improvement, April 12 to 14, 2027, Lyon, France, www.menard-group.com/isqi-lyon2027

ITA World Tunnel Congress 2027 - Antwerp (WTC 2027) Underground Creativity to Meet Societal Needs, 23-29 April 2027, Antwerp, Belgium, <https://wtc2027.com/>

International Symposium Cone Penetration Testing CPT '27, May 12 - 14 2027, Vancouver, Canada, www.cpt27.org



9th International Conference on Unsaturated Soils

6-9 June 2027, Greater Boston, MA, USA

<https://unsat2027.usnh.domains>

The 9th International Conference on Unsaturated Soils (UNSAT 2027) will take place in Greater Boston Area, Massachusetts, USA, from June 6 to 9, 2027, at the Joyce Cummings Center (JCC), Tufts University. The conference will bring together researchers, practitioners, decision makers, and students from around the world to exchange ideas on advances in theory, experiments, and applications in unsaturated soils across scales and disciplines.

UNSAT 2027 will feature plenary and keynote lectures, invited sessions, and peer-reviewed technical papers, covering both fundamental research and engineering applications, and providing a platform for collaboration and meaningful scientific discussion among the unsaturated soils community.

Continuing the tradition of previous UNSAT conferences, UNSAT 2027 will offer a stimulating academic environment for the exchange of ideas. The 9th edition follows the successful series of UNSAT conferences previously held in Milos (2023), Hong Kong (2018), Sydney (2014), Barcelona (2010), Phoenix (2006), Recife (2002), Beijing (1998), and Paris (1995). We look forward to welcoming you to Boston.

Conference Themes

1 Fundamentals and Mechanics

- Micromechanics
- Fundamental Hydro-Thermo-Mechanical Properties
- Dynamics of Unsaturated Soils
- Expansive Soils

2 Modeling and Simulation

- Advances in Computational Modeling
- Physical Modeling and Large Scale Simulations

3 Experimental and Monitoring Techniques

- New Experimental Techniques

- Field Applications and Site Monitoring
- 4 Remote Sensing, AI and Data-Driven Methods**
- Remote Sensing Applications
- Artificial Intelligence and Applications
- 5 Geo-environmental and Bio-geotechnics**
- Geo-environmental Engineering
- Bioremediated and Bioinspired Geotechnics
- Energy Geotechnics
- 6 Infrastructure Geotechnics**
- Shallow Foundations
- Deep Foundations
- Transportation Geotechnics
- 7 Natural Hazards and Climate**
- Slope Stability and Landslides
- Natural Hazards and Extreme Events
- Climate Impacts and System Modeling
- 8 Special Topics and Applications**
- Tailings and Mining
- Cold Regions Geotechnics
- Construction and Case Studies
- Forensic Engineering

Contact

Organizing Committee

Professor Majid Ghayoomi
Chair of UNSAT 2027

majid.ghayoomi@unh.edu

Conference Secretariat

unsat.soils.2027@unh.edu



XVIII DECGE Danube-European Conference on Geotechnical Engineering, 9–12 June 2027, Budapest, Hungary,
<https://18decge.hu/>



1st International Conference on Sustainability in Geotechnical Engineering (ICSGE 2027), Geodiversity & Resilience
28 June to 1 July 2027, Lisbon, Portugal
<https://icsge.lnec.pt>

The National Laboratory for Civil Engineering (Laboratório Nacional de Engenharia Civil – LNEC) is pleased to announce that the **1st International Conference on Sustainability in Geotechnical Engineering (ICSGE 2027)**, under the theme Geodiversity & Resilience, postponed due to the COVID-19 pandemic, has been rescheduled to take place from 28 June to 1 July 2027 at the LNEC Campus in Lisbon, Portugal.

LNEC thanks you for your understanding and cooperation and renews its invitation to participate in the ICSGE 2027, looking forward to the opportunity of welcoming all participants in Lisbon.

The conference is organized under the auspices of ISSMGE TC307 – Sustainability in Geotechnical Engineering and the Portuguese Environmental Geotechnics Commission (CPGA) of the Portuguese Geotechnical Society (SPG).

Scope and aims

Geodiversity and resilience are essential for achieving a sustainable balance between society, the environment, and economic development, making their integration into Geotechnical and geoenvironmental engineering practices fundamental. Innovative geotechnical design and construction can significantly contribute to adopting environmentally friendly, cost-effective, and socially acceptable solutions, while promoting the United Nations' 2030 Sustainable Development Goals.

Experts from around the world will discuss the application of sustainable practices, the mitigation of risks and impacts associated with geotechnical works, and the promotion of geodiversity. It will be an exceptional opportunity to share scientific knowledge, promote resilient and environmentally responsible solutions, encourage the application of innovative methodologies, and strengthen international cooperation.

Conference topics

a. Sustainability frameworks and performance indicators

- Regulations and governance on sustainability in geotechnical engineering
- Sustainability indicators, metrics and assessment tools in geotechnical engineering

b. Innovative, environmentally friendly and energy efficient geotechnical techniques

- On and offshore site investigations
- Waste containment
- Remediation
- Ground improvement
- Construction
- Monitoring

c. Nature-based/nature-inspired solutions for geotechnical applications and geodiversity conservation

- Slope stability
- Erosion control
- Fluvial and coastal protections
- Sediment management in fluvial systems
- Protection of geological landscapes

d. Sustainable use of geotechnical systems and materials

- Circular economy
- Life cycle assessment

- Smart materials
- Retrofitting of foundations and other geotechnical structures

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cursos@lnec.pt

e. Geosynthetics for sustainable engineering solutions

- Geosynthetics in circular construction practices
- Bio-based materials
- Recyclability of geosynthetics
- Benefits of geosynthetics in infrastructure projects

f. Use and reuse of underground space for beneficial purposes

- Storage of carbon dioxide
- Storage of hazardous waste
- Other uses in urban environment

g. Geotechnical techniques involved in the exploitation of renewable energy sources

- Shallow and deep geothermal energies
- Solar and wind energies

h. Socio-economic and landscape impacts from geo-activities

- Infrastructure construction
- Mining and petroleum extractions
- Legacy issues from mining districts
- Waste disposal

i. Vulnerability, mitigation and resilience of geohazards (man-made and natural)

- Multi-hazards
- Global climate change
- Early warning systems and advanced monitoring

j. Geoethics

- Codes of ethics
- Geotechnical engineers' responsibilities to society and the environment
- Ethics in decision-making under uncertainty
- Transparency in disclosure of geological risk to the public and decision makers

k. Education, knowledge transfer and capacity building

- Improving academic curricula on sustainability
- Ongoing professional training
- Community engagement

l. Digital applications for sustainable optimization

- Geodata
- Building Information Modelling (BIM)
- Artificial Intelligence (AI)

Notes: The subtopics listed for each topic are only illustrative

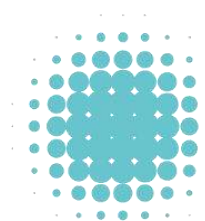
Secretariat contacts

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Contact

(+351) 21 844 3863



ICSE13

International
Conference
on Scour
and Erosion

Porto
Portugal
2027

31 August to 3 September 2027

<https://icse13.org>

The International Conference on Scour and Erosion (ICSE) was established in 2002, and has been run by the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) Technical Committee on Scour and Erosion TC213 (Chair: Shinji Sassa). The first conference was held in College Station Texas, USA (2002), followed by Singapore (2004), Amsterdam, Netherlands (2006), Tokyo, Japan (2008), San Francisco, USA (2010), Paris, France (2012), Perth, Australia (2014), Oxford, UK (2016), Taipei China Taiwan (2018), Virtual, USA (2021), Copenhagen, Denmark (2023), Chongqing, China in (2025). The forthcoming conference will be held in Porto, Portugal, from 31 August to 3 September 2027.

The goal of this conference is to bring together researchers, engineers and managers to share their latest findings on Scour and Erosion. This conference is an excellent platform for presenting your researches, ideas, technology advancements and engineering achievements.

Topics

ICSE2025 focuses on the Advancement of Scour and Erosion for sustainable development.

The following topics are included:

1. Mechanics of Internal Erosion
2. Sediment Transport
3. Effects of Geology on Internal Erosion
4. Rock Scour
5. Erosion and Structures
6. River, Coastal, Estuarine and Marine Scour and Erosion
7. Numerical Modelling of Scour and Erosion
8. Physical Modelling of Scour and Erosion
9. Scour and Erosion Monitoring and Measurement
10. Watershed Scale Soil Erosion, Restoration, and Conservation
11. Scour and Erosion Countermeasures and Mitigation
12. Geo-Hazards Induced by Scour and Internal Erosion
13. Erosion Risk Assessment
14. Case Histories, Lessons Learned, and General Practice
15. Impact and Adaptation

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11th European Conference on Numerical Methods in Geotechnical Engineering, 21 – 24 September 2027, Graz, Austria, www.tugraz.at/events/numge2027/home

16th International Congress on Rock Mechanics Innovations in Rock Mechanics and Rock Engineering for a Sustainable Future, 17-23 October 2027, Seoul, Korea, <https://isrm2027.com>

10th ISSMGE International Congress on Environmental Geotechnics, 01-04 November 2027, Kyoto, Japan, <https://10iceg.org>



**Eurock2028 -
Advances in rock mechanics and rock engineering to cope with increasingly extreme conditions - an ISRM Regional Symposium
25 - 30 Jun, 2028, Aix-en-Provence, France**



ECSMGE 2028
XIX. EUROPEAN CONFERENCE ON SOIL MECHANICS AND
GEOTECHNICAL ENGINEERING

“Connecting Continents Through Geotechnical Innovations”

04-08 September 2028, Istanbul, Turkey
<https://zmqm.org.tr/en>

Conference Topics

- 01 Modelling and Experimental Assessment of Geomaterials
- 02 Geohazards, Earthquakes and Risk Mitigation
- 03 Development of Resilient and Sustainable Geosystems
- 04 Geotechnical Construction and Soil Improvement
- 05 Geotechnical Engineering of Multiscale Observations, Sensors and Monitoring
- 06 Energy Geotechnologies
- 07 Technological Innovation
- 08 Geo Education, Standards And Codes

Contact

R. Duzceer
(President of Turkish National Society for ISSMGE)

ΕΝΔΙΑΦΕΡΟΝΤΑ ΓΕΩΤΕΧΝΙΚΑ ΝΕΑ

Dams around the Earth

Countries around the world continue to invest heavily in dam construction, recognizing their critical role in water management, energy generation, and agricultural support.



Source: International Commission on Large Dams



The 20 February 2026 garbage landslide at Rodriguez, Rizal in the Philippines

Three people were killed in a major failure at a privately owned garbage dump on Friday. Earlier reports of 50 deaths are now believed to have been erroneous.

On 20 February 2026, [the Philippines suffered another major garbage landslide](#), following the tragic events that occurred at [Binaliw in Cebu on 8 January 2026](#), which killed 35 people. This most recent event occurred at Rodriguez in Rizal.

The location of 20 February 2026 landslide is reported to be Sitio 1B Harangan, Barangay San Isidro in Rodriguez. I believe that the landfill is at [14.77036°, 121.15283°], although this is unconfirmed. This is a Google Earth image of the site from April 2025:-



Google Earth image of the likely site of the 20 February 2026 garbage landslide at Rodriguez in the Philippines.

[PTV has a news article about this event](#), which includes mobile phone footage, apparently of the aftermath of the landslide. This is a still from that footage:-



The aftermath of the 20 February 2026 garbage landslide at Rodriguez in the Philippines. [Still from a video posted to Facebook by PTV.](#)

[One person has been confirmed to have been killed in this landslide, and another two are missing. Early reports of up to 50 people being buried](#) have now been dismissed.

The provincial Governor, Nina Ricci Ynares, has written to the Department of Environment and Natural Resources to request a probe into the event. The landfill was reportedly owned and operated by International Solid Waste Integrated Management Specialist, Inc. (ISWIMS), a private company.

There is a lack of high quality research on garbage landslides, despite their substantial impacts. However, [Zhang et al. \(2020\)](#) provided an interesting review of 62 examples from 22 different countries. They concluded that the following were the most common causes of garbage landslides:-

- High landfill leachate level (40% of recorded cases);
- Inadequate compaction (23%)
- Insufficient bearing capacity of the foundation (19%)
- Low shear strength of the interface between the liner and the garbage (11%)

- Rapid release of landfill gas (6%).

It will be interesting to determine the cause of the garbage landslide at Rodriguez, but I would start with an examination of the compaction of the garbage and the management of water / leachate at the site.

Reference

Zhang, Z. et al. 2020. [Global study on slope instability modes based on 62 municipal solid waste landfills. *Waste Management & Research: The Journal for a Sustainable Circular Economy*, 38 \(12\).](https://doi.org/10.1177/0734242X209534)
<https://doi.org/10.1177/0734242X209534>.

(Dave Petley / Eos – The Landslide Blog, 23 February 2026, <https://eos.org/thelandslideblog/rodriguez-garbage-landslide-1>)



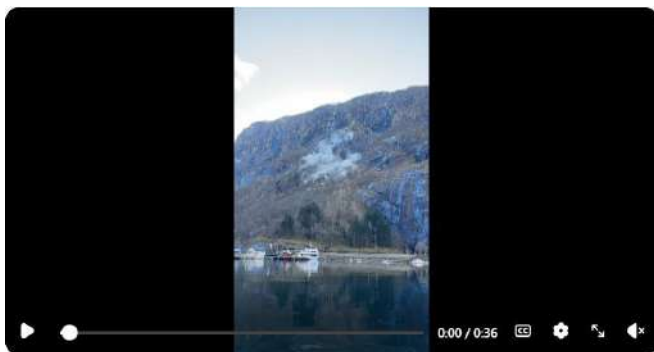
A dramatic rockfall on the E134 road at Fjæra in Etne, Norway

An occupied vehicle was crushed, but the person in the car escaped unhurt.

On 1 March 2026, [a very dramatic rockfall occurred in Fjæra in Etne in Vestland county, Norway](https://eos.org/thelandslideblog/fjaera-rockfall). The rockfall, which originated on a steep rock slope on the flanks of Åkrafjorden, did not kill anyone, but it crushed a pick-up truck (see below). This event is a near-miss in terms of fatalities.

The rockfall was captured on video from the other side of the fjord. [This has been posted to media sites and to Reddit](https://www.reddit.com/r/WTF/comments/1ri48l1/rockfall_in_norway_crushing_a_road_a_car_and_then_some):-

Rockfall in Norway crushing a road, a car, and then some



https://www.reddit.com/r/WTF/comments/1ri48l1/rockfall_in_norway_crushing_a_road_a_car_and_then_some

Not my video, taken from here (crushed car and road pictured inside):

The aftermath was captured in a photo that has been released by the owner of the vehicle, Frode Mæland:-



The aftermath of the 1 March 2026 rockfall Fjæra in Etne in Norway. Image released by Frode Mæland.

Unbelievably, the car was occupied at the time of the rockfall, but the person (Christian Lee) was unharmed.

It appears that the location of this event at Fjæra is [59.87357, 6.38121], although this is unconfirmed.

The road is now closed for further investigation.

(Dave Petley / Eos – The Landslide Blog, 2 March 2026, <https://eos.org/thelandslideblog/fjaera-rockfall>)

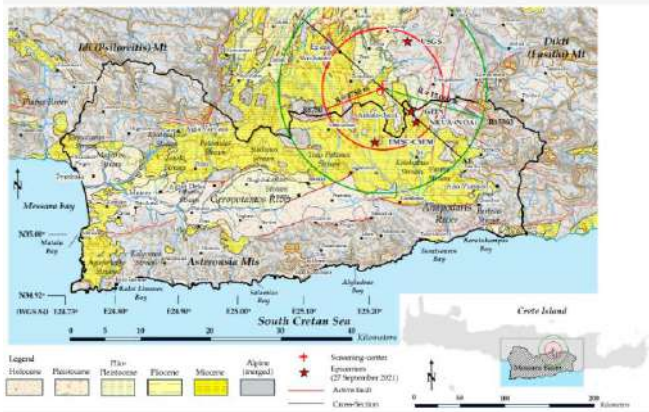
ΕΝΔΙΑΦΕΡΟΝΤΑ - ΣΕΙΣΜΟΙ & ΑΝΤΙΣΕΙΣΜΙΚΗ ΜΗΧΑΝΙΚΗ

Land Subsidence and Earthquake-Timed Vertical Offsets in the Messara Basin, Crete: EGMS-Based Screening for the 2021 Mw 6.0 Arkalochori Earthquake

This study evaluates whether the 27 September 2021 Mw 6.0 Arkalochori earthquake generated detectable, earthquake-timed vertical offsets within the long-standing land subsidence field of the Messara Basin, Crete. Using Copernicus EGMS vertical velocity and time-series products, the work applies a structured, reproducible screening workflow to distinguish potential coseismic signals from ongoing anthropogenic and natural deformation.

The article is published in the Special Issue "Ground Deformation Monitoring via Remote Sensing Time Series Data" of Land (MDPI).

Figure 1. Study area and spatial framework for coseismic-step screening in the Messara Basin (central-southern Crete, Greece). The Messara Basin boundary is shown over a simplified geological background (Holocene–Miocene post-Alpine deposits and merged Alpine basement) [14,15,16,17,18,19,20,21], with mapped active faults in red [22]. Published mainshock epicenter solutions for the 27 September 2021 Arkalochori earthquake are shown as black stars (USGS, GEIN/NOA, NKUA/UOA, EMSC-CSEM) [23,24,25,26]. A fixed screening center (red cross) defines the radii masks R15060 and R8750. A–A1 denotes the trace of the geological cross-section shown later in the manuscript.



Land Subsidence and Earthquake-Timed Vertical Offsets in the Messara Basin, Crete: EGMS-Based Screening for the 2021 Mw 6.0 Arkalochori Earthquake

Ioannis Michalakis and Constantinos Loupasakis

Abstract

Land subsidence and coseismic deformation can interact in groundwater-stressed sedimentary basins, yet basin-scale identification of event-timed vertical offsets in InSAR products requires explicit control of referencing and processing effects. This study evaluates whether the 27 September 2021

Arkalochori earthquake (Mw 6.0; central Crete) produced detectable coseismic vertical offsets within the Messara Basin by applying a reproducible screening workflow to Copernicus European Ground Motion Service (EGMS) Level-3 Vertical time series, from two processing generations (EGMS 2015–2021 and EGMS 2018–2022). An event-centered step metric (stepEQ), defined as the difference between post-event and pre-event mean displacements over a fixed acquisition window, is evaluated across three fixed spatial masks (MESSARA, R15060, R8750) together with a dispersion-based precision proxy (σ_{step}) and a cross-generation sensitivity diagnostic ($\Delta stepEQ$). A supplementary 2 + 2 subset sensitivity analysis indicates that the adopted fixed 3 + 3 estimator is stable at the basin scale, with sensitivity concentrated mainly in threshold-adjacent cases. Results indicate that Arkalochori-related offsets are not expressed as a basin-wide step across Messara; instead, non-background responses form a spatially limited and coherent subset concentrated where the basin intersects the near-source footprint. In EGMS 2018–2022, the higher vertical offset class (C2; $|\Delta stepEQ| > 40$ mm) is exclusively subsidence-direction and is enriched toward the screening center (up to $\sim 19\%$ within the radii mask R8750 m) but remains sparse at the basin scale mask (MESSARA mask) ($\sim 1\%$). Step-dominated points co-locate with strongly subsiding mean vertical velocity regimes and are hosted almost entirely by post-Alpine basin deposits, indicating strong material and background-deformation conditioning of step detectability. Cross-generation comparison shows basin-scale stability of background behavior but localized near-source sensitivity, supporting use of $\Delta stepEQ$ as a Quality Control (QC) lens for threshold-adjacent interpretations. The workflow provides a transparent, transferable approach for prioritizing candidate coseismic-step locations in EGMS time series. Results are interpreted as screening-level evidence in the derived vertical signal using event timing, spatial coherence, and QC diagnostics.

Land 2026, 15(4),
545; <https://doi.org/10.3390/land15040545>

<https://www.mdpi.com/2073-445X/15/4/545>

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΓΕΩΛΟΓΙΑ

'I live in constant fear': surge in giant sinkholes threatens Turkey's farmers

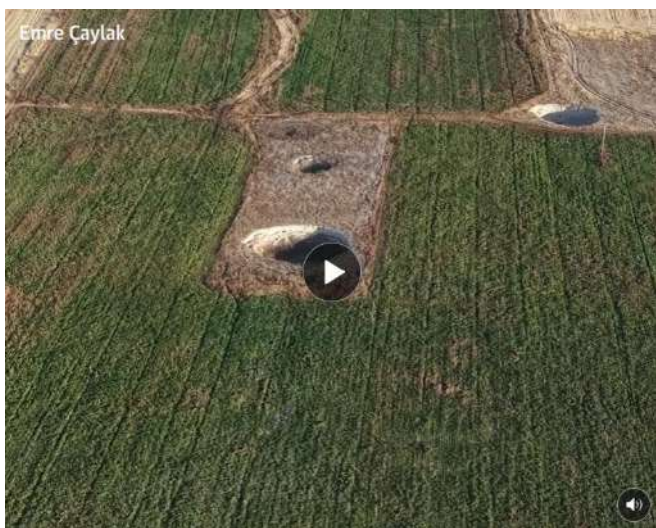
Falling groundwater, extreme heat and water-intensive farming are accelerating land collapse, forcing a rethink in agricultural practices



Sinkholes in Konya province of Turkey. More and more are appearing due to reduced groundwater and overabstraction. Photograph: Emre Çaylak

Fatih Şık was drinking tea with friends at home when he heard a rumbling sound outside that grew to a loud boom, like a volcano had erupted nearby. From the window, he saw water and mud shoot into the sky, as high as the tallest trees, less than 100 metres away.

The 47-year-old knew what it was, because it is common in Karapınar, Konya, a vast agricultural province known as Turkey's breadbasket. A giant sinkhole had opened up on his land. Fifty metres wide and 40 metres deep, it had appeared almost a year to the day after a previous one had formed. It was August – the hottest month of the year.



Sinkholes Loop

Şık was born on the farm he now owns, which his father ran before him, yet he says scientists have told local people the area is no longer livable. One house nearby has collapsed into a sinkhole.

"Every night I pray before I go to bed and when I wake up I pray again," said Şık. "I live in constant fear that a sinkhole will take my house."

Konya, part of the once-fertile Central Anatolia region, gave life to ancient civilisations, including what is believed to be the world's first agricultural society, at Çatalhöyük, in about 8,000BC. It is dotted with the remnants of water cults, Hittite sacred springs and Roman aqueducts, and once offered vital watering holes to traders on the Silk Road.

Now, though, the land is drying up. Turkey [is on the brink of a major drought crisis](#), with almost 90% of the country at risk of becoming desert.

Sinkholes are appearing in farmland in the region at an increasing pace. Experts say there are now almost 700, causing uncertainty and devastation for the farmers who live and work there.



Sinkholes in a farmer's field in Karapınar. Photograph: Emre Çaylak

According to Fetullah Arik, a professor of geology at Konya Technical University who studies sinkholes, the problem stems from dwindling rainfall and reduced groundwater. Local farmers are digging more and deeper wells due to water scarcity, which further depletes groundwater reserves, exacerbating the problem.

Konya has always been geologically prone to sinkholes because much of the region lies on bases of limestone and other soluble rocks, but in recent decades intensive agriculture has led to heavy groundwater extraction for irrigation. As water tables drop, underground cavities lose the support that once held them up.

Pointing to a map of global sinkholes on his office wall, Arik says Konya has the highest density in the world. "Over the past two years, things have accelerated and the difference is hard to ignore," he says.

What was once a slow-moving disaster driven by climate breakdown has accelerated dramatically. Last year saw record heat and low rainfall, and farmers and fishermen told the Guardian they have seen unprecedented drying. The region has lost 186 of its 240 lakes over the past 60 years, according to local reports.



Guardian graphic

Prolonged heatwaves and dry spells, once rare in [Europe](#), now cost about €11bn a year. Central Anatolia faces the brunt in the Mediterranean, one of the fastest-warming regions on Earth. Yet Turkey will host the UN climate summit Cop31 this year, sharing duties with Australia, posing questions about its climate leadership.



The Obruk Hotel stands near a large sinkhole in the Karapınar district of Konya, Turkey. The hotel markets itself as a center for "geotourism," offering visitors unique views of the sinkhole. Photograph: Emre Çaylak

[The country's climate policies are "highly insufficient"](#) to meet

the Paris Agreement's goal of limiting heating to 1.5C above preindustrial levels, according to Climate Action Tracker.

Şık used to water his crops with additional groundwater once in spring and twice in summer, but now there is so little rain he waters five times, then 10.

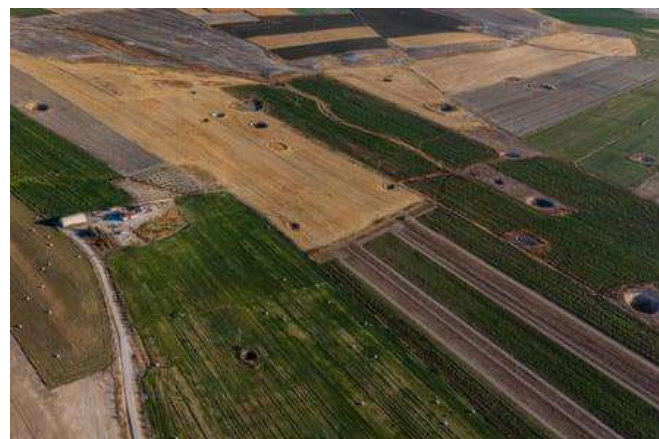
"Ten years ago, we only had to go 30 metres down to find water. Now, it's 90," he says.

There are 100 sinkholes in his neighbourhood, by his estimates. Two swallowed a beetroot field he owned, costing him about £17,000 a year. He estimates he would need 6,000 trucks of sand to fill in his land so he could use it again, but this would cost almost £800,000.

Şık has not received any support and believes he is the last generation to farm the area. He sent his children away to study nursing and dentistry rather than teaching them farming.

Most of Konya's farmers grow water-intensive crops, such as corn, wheat and sugarbeet. Some believe the solution to the region's problems is to adapt farming practices, growing crops that need less water – or no water at all.

Mahmut Senyuz is the head of a farming collective who are the first to reintroduce hemp production in the region, which had been slowly phased out due to regulatory restrictions. While he used to water his corn nine or 10 times a season, he said with hemp it is down to three.



The number of sinkholes and related shallow collapse structures in Turkey's Konya Plain is approaching 3,000. Experts attribute the dramatic rise to regional drought and unsustainable groundwater pumping for agriculture. Photograph: Emre Çaylak

Meanwhile, Dr Ece Onur, lovingly referred to in Turkish media as the country's "most colourful farmer" due to her tendency to wear striking dungarees, is reviving ancient dry-farming practices. Leaving behind a career lecturing military anthropology at Indiana University to return to her ancestral homelands in Burdur, she started a female-led cooperative and also trains growers from across the country.

Dry farming uses no irrigation, instead preparing the soil and encouraging plants to dig their roots deep to draw on natural water reserves. She grows roses and medicinal plants, and says these sorts of crops could be vital to Turkey's future.

"Soil is a living organism," she says. "The only way to solve this crisis is to stop trying to make nature do things our way. We have to imitate her ways."

- This story was produced with support from the Pulitzer Center

This article was amended on 28 February and 1 March 2025. The piece was written by Liz Cookman, not Emre Çaylak, who took the photographs. An earlier version estimated it would cost £35,000 to fix an area of farmland affected by sinkholes; in fact, it would be £800,000. Also, the surname of Fatih Şik has been rendered correctly.

(Liz Cookman in *Karapınar* / The Guardian, Sat 28 Feb 2026, <https://www.theguardian.com/world/2026/feb/28/i-live-in-constant-fear-surge-in-giant-sinkholes-threatens-turkeys-farmers>)



Τεκτονική «ανατροπή» από το Χάρβαρντ: Ο φλοιός της Γης βρισκόταν ήδη σε κίνηση πριν από 3,5 δισ. χρόνια



Η επιφάνεια της Γης δεν ήταν πάντα το μεταβαλλόμενο μωσαϊκό που βλέπουμε σήμερα — όμως νέα στοιχεία υποδηλώνουν ότι άρχισε να κινείται πολύ νωρίτερα από ό,τι πίστευαν κάποτε οι επιστήμονες. Πηγή: AI/ScienceDaily.com

Η ιστορία της [Γης](#) είναι καταγεγραμμένη στις τεκτονικές της πλάκες. Μέσα σε δισεκατομμύρια χρόνια, η κίνησή τους διαμόρφωσε ηπείρους, άνοιξε ωκεανούς και δημιούργησε τα κλίματα και τα περιβάλλοντα που επέτρεψαν στη ζωή να εμφανιστεί και να εξελιχθεί.

Ωστόσο, ένα θεμελιώδες ερώτημα παραμένει αναπάντητο. Πότε άρχισαν στην πραγματικότητα να κινούνται αυτές οι πλάκες;

Άρχισε το εξωτερικό κέλυφος της Γης να **μετατοπίζεται σύντομα μετά τον σχηματισμό του πλανήτη πριν από 4,5 δισεκατομμύρια χρόνια**, ή μήπως αυτή η διαδικασία ξεκίνησε πολύ αργότερα;

Μια νέα [μελέτη](#) από γεωεπιστήμονες του **Χάρβαρντ** προσφέρει την πιο ξεκάθαρη απάντηση μέχρι σήμερα. Η έρευνα, που δημοσιεύτηκε στις **19 Μαρτίου στο περιοδικό Science**, παρέχει τις παλαιότερες άμεσες αποδείξεις για την κίνηση των πλακών, οι οποίες χρονολογούνται πριν από **3,5 δισεκατομμύρια χρόνια**.

Τα ευρήματα δείχνουν ότι η πρώιμη κίνηση των πλακών, ακόμη και αν διέφερε από το σημερινό σύστημα, έπαιξε καθοριστικό ρόλο στη διαμόρφωση του νεαρού πλανήτη.

«Έχει προταθεί ένα τεράστιο εύρος ηλικιών για τον ακριβή χρόνο έναρξης», δήλωσε ο επικεφαλής συγγραφέας **Alec Brenner, διδάκτωρ (PhD '24)**, ο οποίος διεξήγαγε την έρευνα στο **Τμήμα Γεωλογικών και Πλανητικών Επιστημών (EPS) της Μεταπτυχιακής Σχολής Τεχνών και Επι-**

στημών Kenneth C. Griffin του Πανεπιστημίου Χάρβαρντ.

«Με αυτή τη μελέτη, είμαστε σε θέση να πούμε ότι πριν από τριάντισι δισεκατομμύρια χρόνια, μπορούμε να δούμε πλάκες να κινούνται πάνω στην [επιφάνεια](#) της Γης».

Αρχαία πετρώματα: Το «βιβλίο» της Πρώιμης Γης στην Αυστραλία

Η ανακάλυψη αυτή προέρχεται από ορισμένα από τα αρχαιότερα καλοδιατηρημένα πετρώματα της Γης, που βρέθηκαν στο **Κράτωνα Πιλμπάρα (Pilbara Craton) της Δυτικής Αυστραλίας**. Αυτά τα πετρώματα σχηματίστηκαν κατά τον **Αρχαιοζωικό Αιώνα**, μια εποχή κατά την οποία υπήρχε πρώιμη μικροβιακή ζωή και ο πλανήτης δεχόταν συχνές προσκρούσεις από το διάστημα.

Η περιοχή διατηρεί επίσης μερικές από τις αρχαιότερες ενδείξεις ζωής, συμπεριλαμβανομένων των **στρωματόλιθων και των μικροβιακών σχηματισμών** που δημιουργήθηκαν από **μονοκύτταρους οργανισμούς, όπως τα κυανοβακτήρια**.

Η ερευνητική ομάδα, με επικεφαλής τον **Roger Fu, καθηγητή Γεωλογικών και Πλανητικών Επιστημών στο Πανεπιστήμιο Χάρβαρντ**, μελετά το **Ανατολικό Πιλμπάρα από το 2017**.

Ο Fu ειδικεύεται στον παλαιομαγνητισμό, ο οποίος χρησιμοποιεί τα κατάλοιπα του **μαγνητικού πεδίου της Γης** που έχουν διατηρηθεί στα πετρώματα για να ανασυνθέσει το παρελθόν του πλανήτη. Σε προγενέστερη εργασία της, η ομάδα εντόπισε επίσης ίχνη μιας **αρχαίας πρόσκρουσης μετεωρίτη** στην ίδια τοποθεσία.

Παλαιομαγνητισμός: Ένα γεωλογικό GPS 3,5 δισεκατομμυρίων ετών

Ο παλαιομαγνητισμός επιτρέπει στους επιστήμονες όχι μόνο να μελετήσουν το μαγνητικό πεδίο της Γης, αλλά και να παρακολουθήσουν πώς τμήματα του φλοιού μετακινήθηκαν με την πάροδο του χρόνου.

Μικροσκοπικά μαγνητικά σήματα εγκλωβισμένα μέσα σε **κόκκους ορυκτών** λειτουργούν ως αρχείο της θέσης όπου σχηματίστηκαν τα πετρώματα στον πλανήτη.

Αναλύοντας αυτά τα σήματα, οι ερευνητές μπορούν να προσδιορίσουν τόσο τον προσανατολισμό όσο και το **γεωγραφικό πλάτος των πετρωμάτων** κατά τη στιγμή του σχηματισμού τους, μετατρέποντάς τα ουσιαστικά σε ένα είδος αρχαίου GPS.

«Σχεδόν κάθε τι μοναδικό στη Γη σχετίζεται σε κάποιο βαθμό με την τεκτονική των πλακών», δήλωσε ο Fu. «Σε κάποιο σημείο, η Γη μετατράπηκε από κάτι όχι και τόσο ιδιαίτερο — απλώς ένας ακόμα πλανήτης στο ηλιακό σύστημα με παρόμοια υλικά— σε κάτι πολύ ξεχωριστό. Μια πολύ ισχυρή υποψία είναι ότι η τεκτονική των πλακών ήταν αυτή που έθεσε τη Γη σε αυτή την αποκλίνουσα πορεία».

Ανάλυση 900 και πλέον δειγμάτων πετρωμάτων από την περιοχή **North Pole Dome** έδειξε ότι οι τεκτονικές πλάκες κινούνταν με **ταχύτητα 2,5 φορές μεγαλύτερη από την τρέχουσα πριν από 3,2 δισεκατομμύρια χρόνια**. Τα ευρήματα υποδηλώνουν ότι η πρώιμη Γη παρουσίαζε εξαιρετικά ενεργή τεκτονική δραστηριότητα.

Πραγματοποίησαν γεωτρήσεις εξαγοντας κυλινδρικούς “πυρήνες” από τα **πετρώματα χρησιμοποιώντας εξειδικευμένο εξοπλισμό**, καταγράφοντας προσεκτικά τη θέση κάθε δείγματος με εργαλεία που περιλάμβαναν μια πυξίδα και ένα γωνιόμετρο (μια συσκευή μέτρησης γωνιών).

Πίσω στο εργαστήριο, οι πυρήνες κόπηκαν σε λεπτές τομές και αναλύθηκαν με ένα εξαιρετικά ευαίσθητο μαγνητόμετρο,

ικανό να ανιχνεύει σήματα πολύ πιο ασθενή από τη βελόνα μιας πυξίδας. Τα **δείγματα θερμάνθηκαν σταδιακά σε θερμοκρασίες έως και 590 βαθμούς Κελσίου**, προκειμένου να διαχωριστούν τα μαγνητικά σήματα από διαφορετικές περιόδους της ιστορίας τους.

Η πλήρης ανάλυση διήρκεσε περίπου δύο χρόνια. «*Πήραμε ένα πραγματικά μεγάλο ρίσκο*», δήλωσε ο Brenner, σήμερα μεταδιδακτορικός ερευνητής στο Γέιλ. «*Ο απομαγνητισμός χιλιάδων πυρήνων απαιτεί χρόνια. Και πραγματικά, άξιζε τον κόπο! Αυτά τα αποτελέσματα ξεπέρασαν και τα πιο τρελά μας όνειρα*».

Ταχύτητες-ρεκόρ και η μετατόπιση των ηπείρων

Στα **μαγνητικά ορυκτά**, η ευθυγράμμιση των ηλεκτρονίων λειτουργεί σαν μια μικροσκοπική πυξίδα που δείχνει προς τον μαγνητικό πόλο της Γης. Αυτή η ευθυγράμμιση αποκαλύπτει επίσης τη θέση του πετρώματος στον πλανήτη κατά τον σχηματισμό του, συμπεριλαμβανομένου του γεωγραφικού του πλάτους.

Εξετάζοντας **πετρώματα που καλύπτουν περίπου 30 εκατομμύρια χρόνια**, λίγο μετά την περίοδο πριν από 3,5 δισεκατομμύρια έτη, οι ερευνητές διαπίστωσαν ότι **τμήμα της περιοχής του Ανατολικού Πιλμπάρα μετατοπίστηκε σε γεωγραφικό πλάτος από τις 53 μοίρες στις 77 μοίρες**, μια μετατόπιση δεκάδων εκατοστών ετησίως για αρκετά εκατομμύρια χρόνια – και περιστράφηκε δεξιόστροφα κατά περισσότερο από 90 μοίρες. (Επειδή ο μαγνητικός πόλος αντιστρέφεται περιοδικά, παραμένει αβέβαιο αν αυτή η κίνηση συνέβη στο βόρειο ή στο νότιο ημισφαίριο.)

Μετά από περίπου 10 εκατομμύρια χρόνια, η κίνηση επιβραδύνθηκε και τελικά σταθεροποιήθηκε. Για σύγκριση, η **ομάδα εξέτασε πετρώματα από τη Ζώνη Πρασινολίθων Μπάρμπερτον (Barberton Greenstone Belt) στη Νότια Αφρική**. Προηγούμενες μελέτες έδειξαν ότι αυτή η περιοχή παρέμεινε κοντά στον ισημερινό και παρέμεινε ως επί το πλείστον στάσιμη κατά την ίδια περίοδο. Αυτό υποδηλώνει ότι **διαφορετικά τμήματα του φλοιού της Γης κινούνταν με διαφορετικούς τρόπους**.

Σήμερα, οι τεκτονικές πλάκες εξακολουθούν να κινούνται, αν και αργά. Για παράδειγμα, η **Βορειοαμερικανική και η Ευρασιατική πλάκα** απομακρύνονται κατά περίπου 2,5 εκατοστά ανά έτος.

Επαναπροσδιορίζοντας το «κάλυμμα» της Γης

Οι επιστήμονες προσπαθούν ακόμη να προσδιορίσουν ακριβώς πότε και πώς η Γη ανέπτυξε το σύγχρονο σύστημα τεκτονικών πλακών της, γνωστό ως “ενεργό κάλυμμα” (active lid).

Ορισμένες θεωρίες προτείνουν ότι η **πρώιμη Γη είχε ένα “στάσιμο κάλυμμα”** (μια ενιαία, αδιάσπαστη παγκόσμια πλάκα), ένα **“νωθρό κάλυμμα”** (πλάκες που κινούνται αργά) ή ένα **“επεισοδιακό κάλυμμα”** (πλάκες που κινούνται σποραδικά). Αυτή η μελέτη αποκλείει την ιδέα του “στάσιμου καλύμματος”, δείχνοντας ότι η επιφάνεια της Γης ήταν ήδη χωρισμένη σε κινούμενα κομμάτια. Ωστόσο, δεν προσδιορίζει ακόμη ποιος τύπος πρώιμης συμπεριφοράς των πλακών ήταν κυρίαρχος.

Περαιτέρω έρευνα βρίσκεται σε εξέλιξη για την επίλυση αυτού του ζητήματος. «*Βλέπουμε κίνηση των τεκτονικών πλακών, γεγονός που προϋποθέτει την ύπαρξη ορίων μεταξύ αυτών των πλακών και ότι η λιθόσφαιρα δεν ήταν ένα ενιαίο, αδιάσπαστο κέλυφος σε όλο τον κόσμο, όπως πολλοί υποστήριζαν παλαιότερα*», δήλωσε ο Brenner. «*Αντίθετα, ήταν χωρισμένη σε διαφορετικά κομμάτια που μπορούσαν να κινηθούν το ένα σε σχέση με το άλλο*».

Η παλαιότερη μαγνητική αντιστροφή που έχει ανιχνευθεί ποτέ

Οι ερευνητές εντόπισαν επίσης την **παλαιότερη γνωστή γεωμαγνητική αντιστροφή**, μια διαδικασία κατά την οποία το μαγνητικό πεδίο της Γης αντιστρέφεται, έτσι ώστε μια πυξίδα να δείχνει προς τον νότο αντί για τον βορρά.

Αυτή η αντιστροφή πιστεύεται ότι καθοδηγείται από τη «*δράση του δυναμό*» του λιωμένου σιδήρου που κυκλοφορεί στον πυρήνα της Γης, η οποία παράγει ηλεκτρικά ρεύματα και μαγνητικά πεδία. Η πιο πρόσφατη αντιστροφή συνέβη πριν από περίπου 780.000 χρόνια.

Σύμφωνα με τον Fu, τα νέα ευρήματα υποδηλώνουν ότι **τέτοιες αντιστροφές συνέβαιναν λιγότερο συχνά πριν από 3,5 δισεκατομμύρια χρόνια απ' ό,τι σήμερα**. «*Αυτό από μόνο του δεν είναι οριστικό, αλλά υποδηλώνει ότι ίσως το δυναμό βρισκόταν σε ένα ελαφρώς διαφορετικό καθεστώς λειτουργίας σε σχέση με σήμερα*», δήλωσε ο ίδιος.

(Enikos Newsroom / msn, 22.03.2026, https://www.msn.com/el-gr/news/other/τεκτονική-ανατροπή-από-το-χάρβαρντ-ο-φλοιός-της-γης-βρισκόταν-ήδη-σε-κίνηση-πριν-από-3-5-δισ-χρόνια/ar-AA1ZacWy?ocid=nl_article_link)

Paleomagnetic detection of relative plate motions and an infrequently reversing core dynamo at 3.5 Ga

Alec R. Brenner, Roger R. , Bradford J. Foley, Diogo L. Lourenço, Jasmine Palma-Gomez, Zheng Gong, Sarah C. Steele, Joanna Li, David T. Flannery, Adrian J. Brown, and Eben B. Hodgin

Editor's summary

Plate tectonics is a global recycling process that underpins most of Earth's systems. Its onset remains an open question because of sparse early geologic records. Brenner *et al.* collected paleomagnetic data from approximately 3.4 billion-year-old rocks in Western Australia and compared them with existing data from rocks of the same age in South Africa (see the Perspective by Nichols). They detected diverging paleolatitudes, two crustal blocks moving differently around the same magnetic pole. The rate of motion is consistent with aspects of modern plate tectonics but could reflect an earlier style. This plate motion was occurring against the backdrop of the oldest known geomagnetic reversal, which was also discovered from these data. —Angela Hessler

Abstract

Whether early Earth had a mobile lithosphere and plate tectonics is debated. We present paleomagnetic data quantifying differential motion between lithospheric blocks at ~3.48 billion years ago (Ga). This manifested as centimeters per year latitudinal motion of the East Pilbara Craton (Western Australia) across high latitudes, whereas the Barberton Greenstone Belt (South Africa) was stationary at low latitudes. Comparison of this plate motion with candidate analogs suggests either rapid collisional plate tectonics (i.e., an “active-lid”) or an episodically mobile lithosphere. We also document the oldest known geomagnetic reversal at ~3.46 Ga, consistent with an axial dipolar dynamo that reversed less frequently than today's. The existence and rates of these surface and core geophysical phenomena provide geodynamic context to Earth's early geophysical and biological evolution.

Science

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ΕΝΔΙΑΦΕΡΟΝΤΑ - ΠΕΡΙΒΑΛΛΟΝ

Climate change slows Earth's spin: Day lengthening unprecedented in million years

Climate change is lengthening our days because rising sea levels slow Earth's rotation. Researchers from the University of Vienna and ETH Zurich now show that the current increase in day length – 1.33 milliseconds per century – is unprecedented in the past 3.6 million years. The team reconstructed ancient day-length fluctuations using the fossil remains of single-celled marine organisms known as benthic foraminifera.



Climate change is lengthening our days, as the rise in sea levels caused by melting ice slows Earth's rotation. (Image: Markus Trienke on Wikimedia, CC 3.0)

Key messages

- Earth's day is currently lengthening at about 1.33 ms/century, mainly because climate-driven sea-level rise from melting ice redistributes mass and slows Earth's rotation.
- This rate is unprecedented over the past 3.6 million years.
- Researchers reconstructed past day-length changes by inferring sea-level fluctuations from benthic foraminifera fossils and applying a physics-informed probabilistic diffusion model.
- The findings imply modern climate change has been unprecedented at least since the late Pliocene and that the current day-length rise is primarily human-driven.
- By late 21st century, climate's impact on day length may surpass the Moon's effect.
- Despite being millisecond-scale, these changes potentially affect precision-dependent systems such as space navigation.

An exact 24-hour day is not a given – day length changes due to gravitational effects of the Moon, as well as various geophysical processes acting within the Earth's interior, at its surface, and in the atmosphere. Today's climate change also affects day length: prior work showed that from 2000 to 2020 our days lengthened by a rate equivalent to 1.33 milliseconds per century due to climate-related factors, especially the continental-ocean mass redistribution due to the melting of polar ice sheets and mountain glaciers.

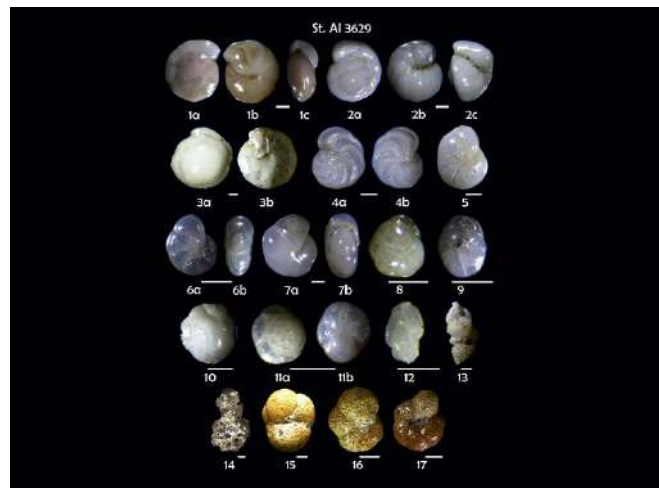
In a new study, now appearing in the *Journal of Geophysical Research: Solid Earth*, Mostafa Kiani Shahvandi (University of Vienna) and Benedikt Soja (ETH Zurich) demonstrate that this rapid rise in day length is unparalleled over the last 3.6 million years.

Earth as a figure skater

"In our earlier work, we showed that the accelerated melting of polar ice sheets and mountain glaciers in the 21st century is raising sea levels, which slows Earth's rotation and therefore lengthens the day – similar to a figure skater who spins more slowly once they stretch their arms, and more rapidly once they keep their hands close to their body," explains Mostafa Kiani Shahvandi of the University of Vienna's Department of Meteorology and Geophysics. "What remained unclear was whether there were earlier periods when climate increased day length at a similarly rapid pace."

Foraminifera as sea-level and day-time indicators

To answer this question, the researchers used the fossilized remains of single-celled marine organisms known as benthic foraminifera. "From the chemical composition of the foraminifera fossils, we can infer sea-level fluctuations and then mathematically derive the corresponding changes in day length," says first author Kiani Shahvandi from the University of Vienna. To draw more robust conclusions, the team employed a probabilistic deep learning algorithm – a physics-informed diffusion model: "This model captures the physics of sea-level change, while remaining robust to the large uncertainties inherent in paleoclimate data," adds the climate scientist and geophysicist.



Using fossil benthic foraminifera, whose shells – through their chemical composition make sea-level fluctuations traceable, scientists were able to show that the current increase in day length – 1.33 milliseconds per century – stands out clearly over the last 3.6 million years.

The result: During the Quaternary (2.6 million years), the growth and melting of large continental ice sheets repeatedly caused significant day-length variations via sea-level changes. Compared with values from the 21st century, however, it is clear that today's increase in day length stands out in the climate history of the past 3.6 million years. "Only one time – around 2 million years ago – the rate of change in length of day was nearly comparable, but never before or after that has the planetary 'figure skater' raised her arms and sea-levels so quickly as in 2000 to 2020", says Kiani Shahvandi.

Rate of day-length change since the late Pliocene is unprecedented

"This rapid increase in day length implies that the rate of

modern climate change has been unprecedented at least since the late Pliocene, 3.6 million years ago. The current rapid rise in day length can thus be attributed primarily to human influences," says Benedikt Soja, Professor of Space Geodesy at ETH Zurich. "By the end of the 21st century, climate change is expected to affect day length even more strongly than the Moon. Even though the changes are only milliseconds, they can cause problems in many areas, for example in precise space navigation, which requires accurate information on Earth's rotation," Soja notes.

Publications

Kiani Shahvandi, M., Soja, B. [external page Climate-induced length of day variations since the Late Pliocene](#). Journal of Geophysical Research (2026), Solid Earth, 131, e2025JB032161, doi: 10.1029/2025JB032161

Kiani Shahvandi, M., Adhikari, S., Dumberry, M., Mishra, S., Soja, B. [external page The increasingly dominant role of climate change on length of day variations](#). Proceedings of the National Academy of Sciences (2024), 121 (30), e2406930121, doi: 10.1073/pnas.2406930121

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(Editorial Office / ETH zürich / [Dept. of Civil, Environmental and Geomatic Engineering](#), 12.03.2026, <https://bauz.ethz.ch/en/news-and-events/news/2026/03/climate-change-slows-earths-spin-day-lengthening-unprecedented-in-3-point-6-million-years.html>)



Το Ηνωμένο Βασίλειο ρίχνει τσιμεντόλιθους 6.000 κιλών στη θάλασσα: Στόχος να ανακτήσει κάτι που έχασε πριν από έναν αιώνα



Φωτογραφία: YouTube/Zoological Society of London

Το Ηνωμένο Βασίλειο έχει ξεκινήσει τη βύθιση τσιμεντένιων μπλοκ στη θάλασσα με στόχο την αναβίωση ενός θαλάσσιου οικοσυστήματος που έχει χαθεί εδώ και πάνω από έναν αιώνα.

Σκοπός της πρωτοβουλίας είναι η αποκατάσταση της οικολογικής ισορροπίας στη Βόρεια Θάλασσα. Το έργο περιλαμβάνει την τοποθέτηση 20 τεχνητών «κύβων-υφάλων», βάρους 6.000 κιλών, οι οποίοι έχουν κατασκευαστεί από υλικό πιο ανθεκτικό στο θαλασσινό νερό, με μικρότερο περιβαλλοντικό αποτύπωμα σε σχέση με το συμβατικό σκυρόδεμα. Οι δομές αυτές λειτουργούν ως βάση για την εγκατάσταση χιλιάδων θαλάσσιων οργανισμών.

Κάθε μία από αυτές τις κατασκευές φιλοξενεί μερικά από τα 4.000 ευρωπαϊκά αυτόχθονα στρείδια που έχουν προετοιμαστεί για αυτή τη φάση αποκατάστασης. Παράλληλα, η αρμόδια ομάδα έχει απελευθερώσει πάνω από 35.000 νεαρά στρείδια προσκολλημένα σε όστρακα και έχει εναποθέσει 40 τόνους επαναχρησιμοποιημένων οστράκων χτενιών για τη δημιουργία του νέου υφάλου.

Γιατί επιστρέφουν τα στρείδια;

Η επιστροφή των στρειδιών θεωρείται κρίσιμη, καθώς αποτελούν βασικούς «μηχανικούς» του οικοσυστήματος: Κάθε στρείδι μπορεί να φιλτράρει έως και 200 λίτρα νερού ημερησίως, βελτιώνοντας την ποιότητα του νερού και του θαλάσσιου περιβάλλοντος. Παράλληλα, οι ύφαλοι τους προσφέρουν καταφύγιο και περιοχές αναπαραγωγής για πολλά είδη, όπως ψάρια καβούρια, γαρίδες και άλλα είδη, συμβάλλοντας σημαντικά στη βιοποικιλότητα.



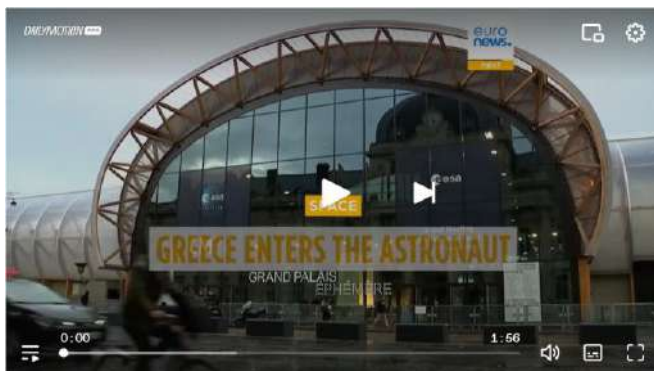
<https://www.youtube.com/watch?v=-0AkRqWCn-Q>

Το νέο αυτό εγχείρημα λαμβάνει υπόψη τα προβλήματα προηγούμενης φάσης το 2023, όταν ακραία καιρικά φαινόμενα, όπως η καταιγίδα «Babet», διέσπειραν μεγάλο μέρος των υλικών που είχαν τοποθετηθεί.

Οι νέοι κύβοι σχεδιάστηκαν ώστε να λειτουργούν ως μια σταθερή και ιδιαίτερα ανθεκτική βάση, που θα παρέχει ένα πιο σταθερό περιβάλλον κατά τη διάρκεια καταιγίδων. Σύμφωνα με τους επιστήμονες που συμμετέχουν, το έργο δεν αφορά μόνο την επαναφορά ενός σχεδόν εξαφανισμένου είδους, αλλά τη δημιουργία ενός πιο υγιούς, ανθεκτικού και πλούσιου σε ζωή θαλάσσιου οικοσυστήματος στη Βόρεια Θάλασσα.

NEWSROOM IEFIMERIDA.GR, 26/03/2026, <https://www.iefimerida.gr/kosmos/inomeno-basileio-rihnei-tsimenolithous-6000-kilon-thalassa>)

ΕΝΔΙΑΦΕΡΟΝΤΑ - ΛΟΙΠΑ



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Dr Adrianos Golemis was selected for ESA's astronaut training programme, after a highly competitive process with over 22,000 applicants. His participation paves the way for a possible Greek presence in a future space mission

Greece is marking a significant milestone in space exploration, as a Greek scientist has been selected to participate in the European Space Agency's (ESA) astronaut training programme, raising the possibility of a Greek astronaut joining a space mission for the first time.

Dr. Adrianos Golemis has begun training at the European Astronaut Centre in Cologne, Germany, having emerged from one of the most competitive selection processes in European aerospace. He was chosen from a pool of more than 22,000 applicants.

The country has historically played a limited role in human spaceflight, and Dr. Golemis's selection represents a genuine shift in that trajectory.

Greece's digital governance minister, Dimitris Papastergiou, called the development a source of national inspiration, particularly for young scientists.

"A few years ago, Greece's position in space seemed like a distant scenario," he told Euronews Next, pointing to recent investments in microsatellites and nanosatellites as evidence of the country's growing ambitions in the sector. He added that Greece's small satellite fleet is expected to be largely completed within the coming months.

ESA has in recent years made deliberate efforts to widen its astronaut corps beyond its traditionally dominant member states.

According to Papastergiou, this investment is not only about scientific progress but also about practical applications that directly affect the everyday life of citizens. Satellite data, he explained, are already being used for more accurate weather forecasting, natural disaster and fire management, as well as for civil protection issues.

At the same time, space applications can contribute to supporting agricultural production, controlling agricultural subsidies and protecting the environment and water. In addition, they play an important role in areas such as telecommunications, cybersecurity and defense, where the use of satellite

data and new technologies is now considered critical to the functioning of modern states.

The minister underlined that the national strategy aims to develop an ecosystem of space applications that will boost the economy and innovation, while providing valuable tools for public decision-making.

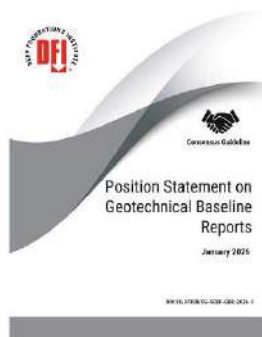
(Foteini Doulgkeri / euronews, 15/03/2026, <https://www.euronews.com/next/2026/03/16/greece-enters-the-astronaut-era-as-scientist-joins-esa-training-programme>)

ΝΕΕΣ ΕΚΔΟΣΕΙΣ ΣΤΙΣ ΓΕΩΤΕΧΝΙΚΕΣ ΕΠΙΣΤΗΜΕΣ

DFI endorses the use of GBRs for geotechnical and geo-structural construction projects.

DOI:10.37308/CG-SCDF-GBR-2026-1

Publication Date: 02/01/2026



Position Statement on Geotechnical Baseline Reports

Geotechnical baseline reports (GBRs) are one method available to identify, characterize, communicate, allocate and manage geotechnical risk in the deep foundations industry. Although they have

been in use for more than three decades, GBRs have not gained widespread use in the industry. This position statement endorses the use of GBRs for geotechnical and geo-structural projects, along with identifying some key considerations for their use.

Position Statement on Geotechnical Baseline Reports

Deep Foundations Institute (DFI) is an international multi-disciplinary professional organization of individuals and corporations assembled to find common ground and create a consensus voice for continual advancement in the geotechnical engineering and construction industry. In supporting its membership, DFI advocates for practices that reduce financial, schedule and performance risk for those involved in geotechnical and geo-structural construction projects. The practices outlined below promote improved understanding of appropriate methods to identify, characterize, communicate, allocate and manage geotechnical construction risk in the industry. As a result, claims and disputes resulting from schedule delays and cost overruns can be reduced.

The American Society of Civil Engineers (ASCE) has developed several editions of a manual on geotechnical baseline reports (GBRs), the most recent of which was published in 2022. This manual is a wealth of useful information on the topic and provides specific background information and guidance on the development and application of GBRs across all types of underground construction. The manual is available at the link below.

Geotechnical Baseline Reports – Suggested Guidelines, ASCE, 2022, Edited by Randall J. Essex <https://ascelibrary.org/doi/book/10.1061/9780784416082>

The DFI Subsurface Characterization for Deep Foundations committee has developed a series of pamphlets on geotechnical baseline reports and geotechnical risk, which provide fundamental information relevant to the topic. These are provided on the committee's webpage and linked below.

Topic 1: Geotechnical Risk Sharing for Deep Foundations

Topic 2: The Geotechnical Baseline Report

Topic 3: Developing a Contract with a GBR

Topic 4: Geotechnical Baseline Reports (GBRs) for Deep Foundation Projects



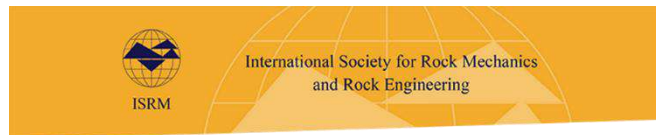
ΕΛΛΗΝΙΚΗ
ΕΠΙΤΡΟΠΗ
ΣΗΡΑΓΓΩΝ ΚΑΙ
ΥΠΟΓΕΙΩΝ ΕΡΓΩΝ

[1ο τεύχος ΔΕΛΤΙΟΥ ΣΗΡΑΓΓΩΝ για το 2026 www.eesy.gr/deltio_siraggon_2026_1](http://www.eesy.gr/deltio_siraggon_2026_1)

Εξεδόθη το 1ο Τεύχος ΔΕΛΤΙΟΥ ΣΗΡΑΓΓΩΝ για το έτος 2026, το οποίο επιμελείται το μέλος του Δ.Σ. και εκδότης της ΕΕΣΥΕ Αν. Καθηγητής ΕΜΠ κ. Βασίλειος Μαρίνος με τα ακόλουθα περιεχόμενα:

1. Διαδρομές της ΕΕΣΥΕ
2. Η ΕΕΣΥΕ στον Παγκόσμιο Χάρτη
3. Οι υπόγειες δράσεις της Ομάδας Νέων Μελών ΕΕΣΥΕ
4. Υπόγεια Έργα υπό κατασκευή στην Ελλάδα
5. Υπόγεια Ορόσημα του Κόσμου
Σημεία αναφοράς της υπόγειας μηχανικής διεθνώς Μάρτιος 2026
Τεχνικές προκλήσεις κατά τη μελέτη και κατασκευή του μητροπολιτικού σιδηροδρόμου της Ντόχα, ενός υπογείου έργου μέγα – κλίμακας
6. Θύμησες παλιές (υπόγειες) από τον Ιωάννη Μπακογιάννη
7. Υπόγειο Παρελθόν από το Μιλτιάδη Φωτιάδη
8. ΔΠΜΣ ΕΜΠ «Σχεδιασμός & Κατασκευή Υπόγειων Έργων». Η υπόγεια εκπαίδευση από μέσα
Τεχνική επισκόπηση του έργου «Σύστημα αντλιοσταμίου της Αμφιλοχίας» από τη σκοπιά μιας Μεταπτυχιακής Φοιτήτριας του ΔΠΜΣ ΕΜΠ «Σχεδιασμός & Κατασκευή Υπογείων Έργων»
9. Ψηφιακά Εργαλεία και Καινοτομία στα Υπόγεια Έργα
10. Τιμητική Αναφορά στον Dr Evert Hoek
11. Σηραγγικά Παράδοξα
12. Επιστημονικά Συνέδρια – Ημερίδες
13. Βιβλία – Νέες Εκδόσεις
14. Γίνε Μέλος της ΕΕΣΥΕ
15. Πρόσκληση Συμμετοχής στο Επόμενο Τεύχος

Το τεύχος αυτό, όπως και όλα τα παλαιότερα τεύχη του περιοδικού μας, είναι διαθέσιμα και στην αντίστοιχη [ενότητα του ιστοχώρου της ΕΕΣΥΕ](#).



ISRM Newsletter No. 73 - Spring 2026 <https://isrm.net/newsletter/show/272>

Κυκλοφόρησε το Τεύχος Αρ. 73 – Άνοιξη 2026 του ISRM Newsletter με τα ακόλουθα περιεχόμενα:

- [2026 ISRM International Symposium, ARMS14 – Fukuoka, Japan, 22–27 November 2026](#)
- [Volume 28 \(2025\) of the ISRM News Journal](#)
- [53rd ISRM Online Lecture by Marc Diederichs](#)
- [10th Latin American Rock Mechanics Symposium \(LARMS 2026\) – Brasilia, Brazil, 26–28 August 2026](#)
- [ISRM Regional Symposium EUROCK 2026 – Skopje, N. Macedonia, 15–19 September 2026](#)
- [Join ISRM2027 – Call for abstracts opening soon](#)
- [GeoEng2030 – Call for bids launched](#)
- [Swedish added to the ISRM glossary](#)
- [Two ISRM Young Members' Seminars in the first quarter of 2026](#)
- [TuniRock 2026 – Hammamet, Tunisia, 9–12 April 2026](#)
- [LaRGE 2026 – Queenstown, New Zealand, 27 April–3 May 2026](#)
- [CouFrac 2026 – Uppsala, Sweden, 20–23 September 2026](#)
- [6th ICITG – Graz, Austria, 13–16 October 2026](#)
- [Slope Stability 2026 – Lima, Peru, 26–29 October 2026](#)
- [10th Conference of the Croatian Geotechnical Society – Split, Croatia, 12–14 November 2026](#)
- [Review of the 1st International Conference on Rock Mechanics and Rock Engineering, Mexico](#)
- [ISRM Sponsored Conferences](#)

ISRM News Journal



[ISRM Newsjournal - 2025, Volume 28](#)

Κυκλοφόρησε ο Τόμος Αρ. 28 December 2025 του ISRM News Journal letter με τα ακόλουθα περιεχόμενα:

Letter from the Editors
Table of Contents

President's message

The 2023-2027 ISRM Board 8

ISRM Board Activities

Report of the ISRM Secretary-General 2025

Membership in June 2025

Rocha Medal 2028

The 2025 ISRM Year

ISRM Commissions

Commissions Workshops and Activities

Online Lecture Series

Fellows

Awards

Technological Innovation Award

Young Rock Engineer Award

Best Performing National Group Award

Rocha Medal 2026

New Suggested Methods and Videos 26

New National Group

ISRM Young Member's Seminar

ISRM Book Series

ISRM Courses

Obituary

Richard Goodman

William Bamford

Forthcoming ISRM Sponsored Conferences

Reports of ISRM Conferences

Eurock 2025

Technical Oversight Committee

Educational Fund Committee

Young Members Committee

ISRM Communication Committee

Reports of ISRM Vice-Presidents

Africa

Asia

Australasia

Europe

Latin America

North America

Vice-Presidents at Large

Milorad Jovanovski

Kyioshi Kishida

Fengshou Zhang

Franklin Lecture | Charalampos Saroglou

Rocha Medal Lecture | Lucille Carbillet

Young Rock Engineer Award | Ignacio Perez Rey

Technological Innovation Award | Institute of Rock and Soil Mechanics

ISRM Corporate Members in 2025



INTERNATIONAL
GEOSYNTHETICS
SOCIETY



March 2026

Helping the world understand the value and appropriate use of geosynthetics.

Final Reminder - IGS Council Elections

Elections for IGS President, Vice President, and Council are nearing completion, with multiple candidates contesting each position. Eligible members will receive their final voting email on Monday 30th March - be sure to check your inbox (and spam folder) for your ballot from UK Engage.

Voting closes at 11:59 PM CDT on Friday, 3 April 2026.

Don't miss your chance to vote and help shape the future of the IGS. After voting, you can also complete a short optional member survey to share your feedback.

[View candidate profiles here](#), cast your vote, and complete the short member survey included after the ballot.



Africa-Middle East Regional Case Study Competition

Entries are still open for the IGS Africa-Middle East Regional Corporate Case Study Competition—but time is running out. This is your chance to showcase innovative projects, gain international visibility, and demonstrate leadership in geosynthetics.

Shortlisted entries will present online in May 2026, with the winner advancing to the global stage at the 13th International Conference on Geosynthetics.

Submission deadline: 30 April 2026 Submit your entry and read more [here](#).



[IGS Foundation Strengthens Fundraising with Key Appointment](#)

The IGS Foundation (IGSF) has partnered with Jonathan Curry to strengthen its fundraising strategy. In this role, Curry will help expand funding opportunities, enhance donor engagement, and support the Foundation's long-term impact in education, research, and geosynthetics development. 📖 Read more [here](#).



Call for Bids: Hosting the GeoEng 2030 Conference

The Federation of International Geo-Engineering Societies (FedIGS) is inviting bids to host the inaugural **GeoEng 2030 Conference**. This flagship event will unite leading societies to showcase advances in geo-engineering and sustainable infrastructure. 📖 Learn more [here](#).



[Download the GeoEng 2030 Conference Bidding Guidelines here \(PDF\)](#)

[Register Now for the Global Geosynthetics Community at 13ICG 2026](#)



The **13th International Conference on Geosynthetics** will take place **13–17 September 2026 in Montreal**, bringing together global experts for technical exchange, networking, and collaboration.

Under the theme "*Legacy, Evolution & Revolution in Geosynthetics*," the event will explore key industry challenges, including sustainability, climate change, and resilient infrastructure. [Read the full article on our website](#).

Premium Corporate Member Spotlight: Solmax

This month, we feature Solmax in our **Premium Corporate Member spotlight**. Explore their NJDOT Wildwood Channel case study, where geotube technology enabled efficient dewatering and coastal restoration.

Solmax's collaboration with Sistema.bio is also bringing clean energy and regenerative agriculture to farming communities through biodigesters that convert waste into biogas and organic fertiliser—supporting healthier soils and reduced emissions.

Read the Wildwood case study [here](#) and learn more about the collaboration [here](#).

SOLMAX SISTEMA.bio



Turning farm waste into clean energy and healthier soils. 🌱

SOLMAX SISTEMA.bio



Geomembrane liners helping biodigesters convert livestock waste into renewable biogas and organic fertiliser. 🌱

[Learn more](#) about the benefits of becoming a **Premium Corporate Member**.



GeoAfrica 2027 – Save the Date

GeoAfrica 2027 is set to bring together professionals from across the geotechnical and geosynthetics community for a major regional gathering focused on innovation, collaboration, and sustainable infrastructure.

Further details will be announced in due course—so be sure to keep an eye out for updates and opportunities to get involved.

Learn more information visit the GeoAfrica Website [here](#).

5th Workshop of IGS TC-Reinforcement & ISSMGE TC-218

The **5th Workshop of IGS TC-Reinforcement (TC-R)**, in collaboration with **ISSMGE TC-218**, will take place **7–9 July 2026 in Reggio Calabria, Italy**.



The programme will explore key topics including seismic performance, recycled materials, design methods, and case studies, with opportunities to submit abstracts and join technical discussions.

You can find out more information [here](#) and register your interest [here](#).

IGS Relaunches the "Did You Know?" Series

We're excited to relaunch the **IGS "Did You Know?" series**, sharing quick insights on the impact of geosynthetics in infrastructure and sustainability.

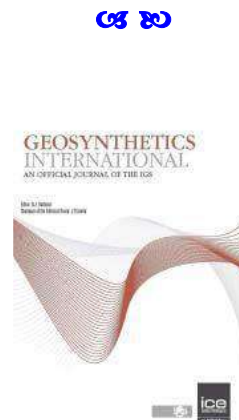
The first two articles explore how [geosynthetics can significantly reduce aggregate use](#) and [support the UN Sustainable Development Goals](#).

Follow us on [LinkedIn](#) for weekly posts and more insights.

IGS Geosynthetics Handbook Available To Buy Now

The long-awaited **IGS Geosynthetics Handbook** is now available to buy. A one-stop technical reference guide suitable for all levels of experience in geosynthetics. The handbook offers a concise yet comprehensive summary of the fundamental applications of geosynthetics and is an essential reference guide for student, instructor or civil engineering professional alike.

Non member price: \$200 USD
Member price: \$150 USD



IGS Chapters can access a bulk buy discount of 30 copies or more at \$75 USD per copy, for this option only, contact igs-sec@geosyntheticssociety.org.

Get Your Handbook Today

Upcoming Events

Explore the upcoming IGS events, industry events we will be attending and events delivered by IGS Chapters.

30 Jun–02 Jul 2026 CEN TC 189 Meetings Copenhagen, Denmark

European standards committee meetings on geosynthetics, relevant for European practitioners and manufacturers. [Event page](#)

07–09 Jul 2026 5th Workshop of IGS TC-Reinforcement & ISSMGE TC-218 Mediterranean University of Reggio Calabria, Italy

The workshop will cover reinforced soil structures and geosynthetic solutions, including seismic performance, sustainable backfills, construction practices, and design methods. [Event page](#)

13–17 Sep 2026 13th International Conference on Geosynthetics Montreal, Canada

The conference theme, “**Legacy, Evolution & Revolution in Geosynthetics,**” emphasizes innovation, sustainability, and global collaboration. Scheduled at the Palais des congrès de Montréal, attendees can access technical sessions, workshops, and networking opportunities. You can now register to attend at www.xcdsystem.com/icg. [Event page](#)

13–16 Oct 2026 6th International Conference on Information Technology in Geo-Engineering (6th ICITG) Graz, Austria

The event explores digital innovations in geo-engineering, including BIM, monitoring, AI, and information modelling for engineering applications. [Event page](#)

2027 Sustainability Leads 5th GeoAfrica Conference Gauteng, South Africa

The 5th African Regional Conference on Geosynthetics (GeoAfrica 5) will take place in March 2027 at Misty Hills, Gauteng, South Africa. Hosted by IGS South Africa, the event will showcase sustainable geosynthetic solutions and innovations across infrastructure projects in Southern Africa. [Event page](#)

Geosynthetics International

www.emerald.com/jgein/issue/33/1

Κυκλοφόρησε το τεύχος Volume 33, Issue 1, March, 2026 του Geosynthetics International της International Geo-synthetics Society με τα ακόλουθα περιεχόμενα:

Research Articles

[Using EPS geof foam blocks to protect buried pipes against strike-slip fault movement](#), [D. Perdibuka](#); [A. Edinçliler](#); [E. Uçkan](#)

[Airlift-assisted vacuum preloading: application of airlift via PVDs in vacuum preloading](#), [X. Lin](#); [L. Shi](#); [K. Yao](#); [K. Wang](#); [Y. Cai](#)

[Serviceability performance of piled embankments considering soil-reinforcement interface interaction](#), [X. Zhang](#); [C. Yang](#); [T. Li](#); [W. Duan](#); [N. Zhang](#)

[3D-printed AD-EKG for reinforcement and remediation of heavy metal-contaminated soils](#), [G.-Y. Chen](#); [L.-W. Zheng](#); [G.-Q. Wu](#); [X.-L. Zhang](#); [K.-N. Liu](#); [X.-Y. Xie](#)

[Perfluoroalkyl substances \(PFAS\) partitioning into a high-density polyethylene geomembrane](#), [X. Xiang](#); [A. Bouazza](#); [E. Mikhael](#); [J. Scheirs](#)

[DEM-FDM analysis in stereoscopic geogrid-reinforced interface under cyclic loading](#), [W-X Zeng](#); [F-Y Liu](#); [M-J Ying](#); [S-X Zhang](#); [C-B Gao](#)

[Rheological properties and viscoelastic model of sensor-enabled piezoelectric geocable](#), [Z. Liu](#); [G. Cai](#); [J. Wang](#); [M. Wu](#); [C. Wang](#); [Z. Lu](#); [Q. Fang](#)

[Drainage performance of wicking geotextiles under rainfall and capillary rise conditions](#), [J. Jarjour](#); [M. A. Meguid](#); [S. Bhat](#)

[Freeze-thaw durability of fiber-lime-soil based on mechanical damage and crack features](#), [L. Wei](#); [Q. Y. Liu](#); [S. X. Chai](#)

[Influence of foundation soil conditions on the service performance of GRS abutments](#), [J. Deng](#); [W. Guo](#); [Y. Jiang](#); [J.-J. Zheng](#); [Y. Zheng](#)

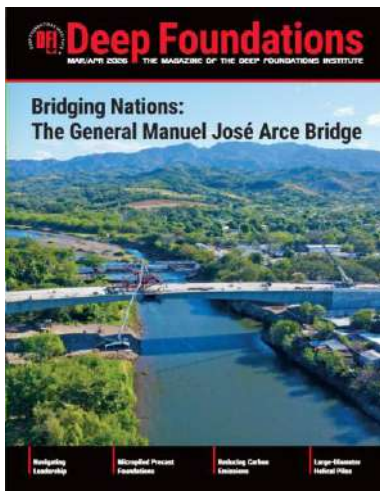
[Direct relaxation method to calculate stresses induced by gravel particles in a geomembrane](#), [H. M. G. Eldesouky](#); [R. W. I. Brachman](#)

[Experimental evaluation of a newly developed nanocoating for EPS](#), [M. M. Omran](#); [A. M. Ahmed](#); [R. Adel](#); [I. S. Fahim](#); [E. S. Bakhoun](#); [S. S. AbdelSalam](#)

Discussion Papers

[Discussion: Geotechnical characterization of soil-rubber mixtures with well graded gravel](#), [A. Cherif Taiba](#); [Y. Mahmoudi](#); [M. Belkhatir](#)

[Response to discussion: Geotechnical characterization of soil-rubber mixtures with well-graded gravel](#), [A. Fiamingo](#); [G. Chiaro](#); [A. Murali](#); [M. R. Massimino](#)



Highlights of the Mar/Apr Issue

www.nxtbook.com/dfi/DEEP-FOUNDATIONS/march-april-2026/index.php#/p/Intro

Highlights of the Mar/Apr Issue

[Cover Story: Bridging Nations: The General Manuel José Arce Bridge](#)

[Navigating Leadership: Perspectives from Women in the Deep Foundations Industry](#)

[Micropiled Precast Foundations in Energy Transmission Infrastructure](#)

[Toulouse Metro Line C: Reducing Carbon Emissions](#)

[The Rise of Large-Diameter Helical Piles in Modern Construction](#)

[Member Profile: Zoran, "Zac" Curanovic, P.E., Is Always Ready for a Challenge](#)

[Pay Only For What You Need — A Sound Approach Toward Sustainability](#)

[Key Contract Provisions for a More Profitable 2026](#)

[Accounting for Tariffs in Construction Contracts](#)



www.icold-cigb.org/userfiles/files/NEWSLETTERS/Newsletter25.pdf

Κυκλοφόρησε το τεύχος #25 – 2026 του THE DAMS NEWSLETTER της International Committee on Large Dams με τα ακόλουθα περιεχόμενα:

- Foreword from Humberto Marengo Mogollon, President of Mexican Large Dams Committee (p. 2-3)
- ICDSME2025: Advancing dam safety for energy transition and water transformation (p. 4-6)
- A Networking luncheon on gender diversity & inclusion in the dam engineering profession (p. 7)
- Guadalajara: ICOLD 94th Annual Meeting (p. 8-13)
- Hydropower Engineering and Clean Energy Integration on the Dadu River (China) (p. 14-15)
- Innovation Awards 2025 (p. 16-27)
- New ICOLD Bulletins available (p. 28-29)
- The Importance of Earthquake Safety of Dams (p. 30)
- Seismic Safety of Dams and Sustainability (p. 31)
- 2nd International Conference on Sustainable Hydropower Development in the Himalayas (p. 32-33)
- Dams finally at the COP (p. 34-36)
- HYDRO 2025 (p. 38-39)
- International Conference Dam Safety (ICDS 2026), India (p. 40-41)
- CFBR: A Century of Expertise (p. 42-43)

ΕΚΤΕΛΕΣΤΙΚΗ ΕΠΙΤΡΟΠΗ ΕΕΕΕΓΜ (2023 – 2026)

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