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World Association for Sedimentation & Erosion Research – WASER

NEWSLETTER

Reporting WASER news to you regularly

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NEWS

China focus: China's intelligent river governance draws global attention

WUHAN (Sept 26, 2025) -- China's use of intelligent technology in river governance is attracting global interest as experts and officials gathered in Central China's Wuhan for the 2025 Great Rivers Forum amid mounting climate challenges around the world.

On Friday afternoon, Lu Hui, professor at the Department of Earth System Science of Tsinghua University, presented new applications of digital technology in mountain flood control at a parallel forum on the sustainable development of great river civilizations in the era of digital intelligence.

"China has 570,000 mountain flood risk points, and many mountainous areas lack effective monitoring methods, leading to delayed responses," Lu said. He highlighted an intelligent early-warning platform that integrates radar, satellites and AI algorithms to track rainstorms, simulate flood processes, and deliver timely alerts. The system, which was tested during the extreme rainfall event in Beijing in 2023, has greatly enhanced forecasting accuracy and supported emergency response efforts.

Lu said the approach is also cost-effective and can be applied beyond China. "With drones, we were able to complete sub-meter modeling of more than 140 flood gullies across Beijing in just over a month," he noted. "China's experience in managing mountain floods is now ready to be shared with other countries."

The presentation drew strong interest from Ratna Rajah, director of the Humid Tropics Centre Kuala Lumpur under UNESCO. Holding up his phone to record Lu's speech, Rajah later sought further discussion with the Tsinghua professor. "If we start from zero on water governance, we could already be 10 or 20 years behind, but through platforms like this, we can stand on the shoulders of experts," Rajah noted.

Rajah said that Malaysia, with an average annual rainfall of 3,000 millimeters every year, faces growing challenges from climate change. "Previously, rainfall of around 120 millimeters would typically spread over three hours. But now, we're seeing the same amount fall within just one hour. This intensity is putting a strain on our drainage systems," he said.

"We're exploring the underground storage, similar to the 'Sponge City' concept implemented here in Wuhan. This is an area we're very interested in, and I'm also working with my colleague here to study the concept further," Rajah added.

Digital transformation was also a key point of discussion. Philippe Gourbesville, president of the International Association for Hydro-Environment Engineering and Research, said he was impressed by China's digital twin systems for the Yangtze and Yellow rivers.

"The digital twin will provide the right information to the decision makers to be sure that the right decision will be taken ... The expectation of this digital transformation is to provide better services at the end and to have more reliable services," Gourbesville said.

The forum also highlighted the cultural dimensions of river governance. Spanning 30 world natural and cultural heritage sites, the Yangtze River National Cultural Park's construction is in full swing. During the forum, experts shared how China is using AR, VR and AI technologies to preserve and showcase ancient cultural heritage along the river. These technologies ensure that traditions remain visible and accessible in the digital age.

"This integration of cultural revitalization and ecological continuity reflects China's traditional wisdom of harmony between humanity and nature, and provides a Chinese solution for global sustainable development," said Ren Hui, an official with the Yangtze River National Cultural Park.

China has actively supported the United Nations 2030 Agenda for Sustainable Development and has worked with partner countries to establish multilateral mechanisms such as the China-EU Water Policy Dialogue and Lancang-Mekong Cooperation, promoting reforms in global ecological governance.

Chinese companies have designed or built major water infrastructure projects, including the Karot Hydropower Station in Pakistan, the Kaleta Hydropower Station in Guinea, and the Upper Atbara Water Project in Sudan. These projects have helped local communities enhance their water supply and improve electricity access, benefiting millions of people.

"River governance should not be carried out behind closed doors," said Wu Changhua, chair of the Governing Council of the Asia-Pacific Water Forum Governing Council. "We have much to learn from each other. And our mission is to link these scattered river cultures into a cohesive regional whole, promoting their influence beyond borders."

Forum focuses on promoting river cultures

The 2025 Yangtze River Civilization Forum was held in Chongqing, Sept 17, 2025.

Experts on the world's major river civilizations gathered in Chongqing to exchange their insights on how to protect and promote cultures.

Themed "Bridging Rivers and Seas, Sharing Wisdom of Civilizations", the 2025 Yangtze River Civilization Forum focused on protecting the Yangtze River's cultural heritage and deepening exchanges among the world's major river civilizations.

The event was cohosted by Chongqing and the Chinese Academy of Social Sciences (CASS).

Located on the upper reaches of the Yangtze River, Chongqing boasts key geographic advantages as a strategic pivot point in the national development programs for China's western regions and the Chengdu-Chongqing economic circle. It is also a connecting point for the Belt and Road Initiative and the Yangtze River Economic Belt.

Peng Jinhui, vice-president of CASS, said that China's residents should protect and promote the Yangtze River culture, which provides strong spiritual motivation for the high-quality development of the Yangtze River Economic Belt.

"The Yangtze River has always been an open and inclusive river, serving as an important channel for the exchange and mutual learning of civilizations," Peng said at the forum.

"It has fostered the millenniums-old cultural heritage along the river, nurturing the shared spiritual home of the Chinese nation," he added.

The event also attracted experts and scholars from the United Kingdom, Brazil, Egypt, Pakistan and other countries who study the Nile River basin, ancient Mesopotamia, Amazon River basin, Indus River basin and other great river civilizations.

"It is a very rewarding experience to see that they (experts working on the Yangtze River civilization) are trying to learn from the past in order to improve modern day life," said Magnus Widell, a professor from the University of Liverpool.

"As a Mesopotamian scholar looking at the Yangtze civilization, I see a lot of parallels and opportunities for research and collaborations, and I want to connect with them, and hopefully, sort of create contacts that may lead to long-term research collaborations."

The forum includes a series of cultural seminars and exchange activities. At the 2025 Longgupo Site Academic Seminar held on Wednesday, experts on the world's major river civilizations from China, France, the UK, Malaysia, Brazil, Pakistan and Argentina, gathered to explore the provocative hypothesis that Asia may have been a cradle of early human civilization.

This year marks the 40th anniversary of the discovery of the Longgupo Site, a pivotal location in the study of early human history situated in Xincheng village, Chongqing's Wushan county. Initially identified as a fossil site in 1984, it revealed human fossils and cultural relics the following year. By the end of last year, five rounds of excavations had been completed.

Paleomagnetic dating from 2022 suggests that the site dates back 2.5 to 2 million years in the Early Pleistocene period, making it one of the earliest known sites in East Asia. Its rich content provides invaluable study into the human origins and evolutions of humans in the region.

The Yangtze flows for 6,300 kilometers from glaciers in the Qinghai-Tibet Plateau through Chongqing, Wuhan, capital of Hubei province and Nanjing, capital of Jiangsu province, before reaching the East China Sea in Shanghai.

The river has fed people living along its banks with a wealth of natural resources for thousands of years. One of the cradles of Chinese civilization, it is known as the "mother river", and more than 400 million people get their drinking water from it.

Cosmic muons monitor river sediments surrounding Shanghai tunnel

Trundling along A portable version of the team's muon detector was used along the length of the tunnel. (Courtesy: Kim Siang Khaw et al/Journal of Applied Physics/CC BY 4.0)

Researchers in China say that they are the first to use cosmic-ray muography to monitor the region surrounding a tunnel. Described as a lightweight, robust and affordable scintillator setup, the technology was developed by Kim Siang Khaw at Shanghai Jiao Tong University and colleagues.

They hope that their approach could provide a reliable and non-invasive method for the real-time monitoring of subterranean infrastructure.

Monitoring the structural health of tunnels and other underground infrastructure is challenging because of the lack of access. Inspection often relies on techniques such as borehole drilling, sonar scanning, and multibeam echo sounders to determine when maintenance is needed. These methods can be invasive, low resolution and involve costly and disruptive shutdowns. As a result there is often a trade-off between the quality of inspections and the frequency at which they are done.

This applies to the Shanghai Outer Ring Tunnel: a major travel artery in China's largest city, which runs for almost 3 km beneath the Huangpu River. Completed in 2023, the submerged section of the tunnel is immersed in water-saturated sediment, creating a unique set of challenges for structural inspection.

Time-varying stresses

In particular, different layers of sediment surrounding the tunnel can vary widely in their density, permeability, and cohesion. As they build up above the tunnel, they can impart uneven, time-varying stresses, making it incredibly challenging for existing techniques to accurately assess when maintenance is needed.

To address these challenges, a multi-disciplinary team was formed to explore possible solutions. "During these talks, the Shanghai Municipal Bureau of Planning and Natural Resources emphasized the practical challenges of monitoring sediment build-up around critical infrastructure, such as the Shanghai Outer Ring Tunnel, without causing disruptive and costly shutdowns," Khaw describes.

Among the most promising solutions they discussed was muography, which involves detecting the muons created when high-energy cosmic rays interact with Earth's upper atmosphere. These muons can penetrate deep beneath Earth's surface and are absorbed at highly predictable rates depending on the density of the material they pass through.

A simple version of muography involves placing a muon detector on the surface of an object and another detector beneath the object. By comparing the muon fluxes in the two detectors, the density of the object can be determined. By measuring the flux attenuation along different paths through the object, an image of the interior density of the object can be obtained.

Muography has been used for several decades in areas as diverse as archaeology, volcanology and monitoring riverbanks. So far, however, its potential for monitoring underground infrastructure has gone largely untapped.

"We took this 'old-school' technique and pioneered its use in a completely new scenario: dynamically monitoring low-density, watery sediment build-up above a submerged, operational tunnel," Khaw explains. "Our approach was not just in the hardware, but in integrating the detector data with a simplified tunnel model and validating it against environmental factors like river tides."

With its durable, lightweight, and affordable design, the scintillator features a dual-layer configuration that suppresses background noise while capturing cosmic muons over a broad range of angles. Crucially, it is portable and could be discreetly positioned inside an underground tunnel to carry out real-time measurements, even as traffic flows.

Sediment profiles

To test the design, Khaw's team took measurements along the full length of the Shanghai Outer Ring Tunnel while it was undergoing maintenance; allowing them to map out a profile of the sediment surrounding the tunnel. They then compared their muon flux measurements with model predictions based on sediment profiles for the Huangpu River measured in previous years. They were pleased to obtain results that were better than anticipated.

"We didn't know the actual tidal height until we completed the measurement and checked tidal gauge data," Khaw describes. "The most surprising and exciting discovery was a clear anti-correlation between muon flux and the tidal height of the Huangpu River." Unexpectedly, the detector was also highly effective at measuring the real-time height of water above the tunnel, with its detected flux closely following the ebb and flow of the tides. Reassuringly, the team's measurements confirmed that there are no as-yet unmapped obstructions or gaps in the sediment above the tunnel thereby confirming the structure's safety.

"Additionally, we have effectively shown a dual-purpose technology: it offers a reliable, non-invasive method for sediment monitoring and also reveals a new technique for tidal monitoring," says Khaw. "This opens the possibility of using muon detectors as multi-functional sensors for comprehensive urban infrastructure and environmental oversight."

The research is described in the Journal of Applied Physics.

(Source: https://physicsworld.com/ Cosmic muons monitor river sediments surrounding Shanghai tunnel – Physics World)

Afforestation turns barren ravine into green oasis

For over 40 years, Wang Zhanfeng had rooted himself in the barren mountains of Youyu county in the northern province of Shanxi. Starting from the challenging task of planting the first sapling amid swirling yellow sands, he has now transformed over 200 hectares of land into lush woodland, significantly altering the local ecosystem.

An historical photo shows people carrying saplings to plant in Youyu county, Shanxi province, in the 1970s. CHINA DAILY

Wang, 74, a villager from Laoqiangkuang village, bears calloused hands as evidence of his decades-long dedication.

"In my childhood, we had to cover our bowls while eating, otherwise they would be filled with sand," Wang told China Daily. Villagers had to wear windproof goggles and sand masks when venturing outside. During the worst winds, they had to light lamps indoors during the day.

Youyu is situated less than 100 kilometers from the Mu Us Desert located between the Inner Mongolia autonomous region and Shaanxi province, positioned in a natural wind corridor where the Siberian cold air moves southward.

In the early years of New China, the county faced severe environmental conditions with extensive land desertification and extremely low plant survival rates. It was once deemed by international environmental experts as one of the "least suitable areas for human habitation", prompting suggestions for the relocation of the entire county.

However, the locals were determined to make a change.

Zhanfeng checks the growth of apricots at his family's orchard in Laoqiangkuang village in Youyu on July 5. SUN HAO/FOR CHINA DAILY

Wang's grandfather and father had shouldered shovels to plant trees voluntarily. In the 1980s, upon hearing that his hometown was still battling sandstorms, he closed his hotel business and returned to the village, determined to protect the land and turn the barren slopes green.

His tree-planting endeavors faced three major challenges.

Acquiring seedlings was difficult, requiring arduous journeys over mountains to fetch them. Planting was challenging due to the semi-desert soil's inability to retain water, necessitating the laying of river mud at the bottom of pits. Survival was tough for seedlings, with an average annual precipitation of fewer than 400 millimeters, prompting the innovation of "fish-scale pits" to collect rainwater on the mountainside.

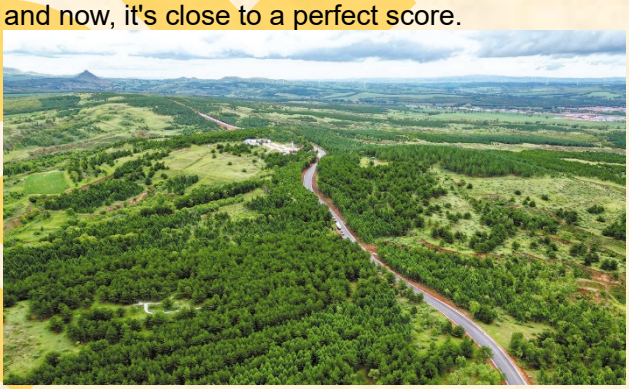
Even then, during droughts, manual watering was necessary. Local women organized water-carrying teams, joining men in hauling water from the valleys to irrigate the saplings.

Equipped with his "three treasures" — a shovel for digging holes, dried bread as food on mountains, and frostbite ointment for cracked hands — Wang would dig and plant trees in up to 50 pits a day at his peak, often leaving him too exhausted to stand straight.

"I've thought about giving up, it's too tough," Wang said. Yet, seeing newly planted saplings partially buried by sand, he couldn't help but brush off the soil and prop them upright again.

"One must not abandon halfway; trees are no different."

After numerous failed attempts, he gradually mastered the art of tree planting. After 2000, the survival rates of his trees reached 80-90 percent and now, it's close to a perfect score.



An aerial photo shows part of a forest park in Youyu, which has been transformed from a barren area through decades of afforestation. ZHU XINGXIN/CHINA DAILY

Today, green grass, Mongolian pine, pitch pine, and larch trees cover the Shipaogou area — what was once a barren ravine had transformed into his daily "green sanctuary".

Carrying scissors during his mountain patrols, he prunes crooked branches as if he is tending to his own children. "While the green hills and clear waters have taken shape, the transformation is not yet complete," he said.

Throughout history, Youyu had been a meeting point of agricultural and grassland civilizations, as well as a crucial passage for Shanxi merchants traveling to Mongolia. However, continuous wars had ravaged its ecology.

For over 70 years, Youyu had relentlessly pursued tree planting and afforestation to improve the

environment. With nearly 130 million trees planted across almost 113,333 hectares, the county's forest cover surged from less than 0.3 percent to 57 percent. What was once a "barren land" had metamorphosed into a "green oasis".

In October 2024, the 19th annual session of the Global Forum on Human Settlements and the New Sustainable Cities and Human Settlements Awards ceremony took place at the United Nations Headquarters in New York.

The submission from Youyu county, detailing the "70-year practice of desert control, afforestation, and ecological restoration", clinched the New Sustainable Cities and Human Settlements Award.

Ma Zhanwen, Party secretary of Youyu, said, "Over the 70 years, Youyu's ecological civilization practice, through the diligent efforts of several generations, vividly exemplifies the 'lucid waters and lush mountains are invaluable assets' concept of green development, paving a viable path for ecological restoration and sustainable development in desertified regions."

(Source: https://www.chinadaily.com.cn/a/202508/01/WS688c177aa310c26fd717ce67.html)

IRTCES participates in water resources forum of the 7th China-Arab expo

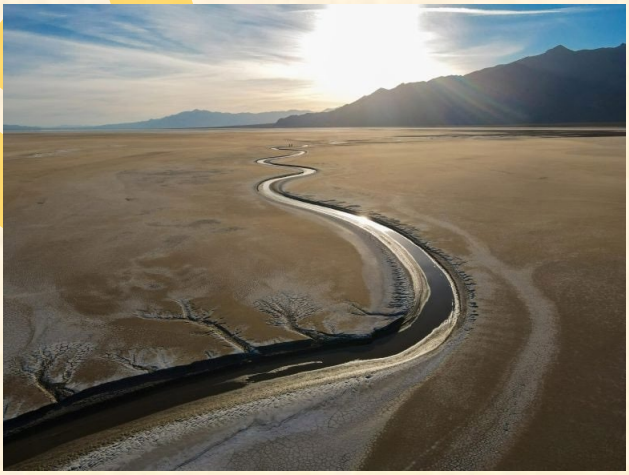
The 7th China-Arab States Expo Water Resources Forum was held in Yinchuan, Ningxia, China, on August 29, 2025. Mr. CHEN Yong, Chairman of the Chinese People's Political Consultative Conference (CPPCC) Ningxia Hui Autonomous Region Committee; Mr. LIU Dongshun, Vice Minister of Water Resources; Mr. Mohamed Al-Sheikh, Ambassador of the Kingdom of Bahrain to China; and Mr. Hamad Ait Bahaa, Vice President of the Draa-Tafilalet Region of Morocco, delivered speeches. Over 300 guests from China, Saudi Arabia, Morocco, Bahrain, Egypt, Pakistan and other countries attended the event.

With the theme "Industry Empowers the 'Four Waters, Four Determinations' Principle and Intensive & Economical Utilization of Water Resources", the forum aimed to facilitate academic exchanges in water-related fields, release the China-Arab Water Conservation Development Outlook Report and achievements of international water conservancy cooperation, and advance in-depth exchanges and collaboration in water conservancy between China, Arab states, and other countries participating in the Belt and Road Initiative (BRI).

During the event, 20 practical and impactful water conservancy cooperation achievements—demonstrated to be effective in China, Arab states, and other BRI partner countries—were unveiled. These achievements span multiple categories, including exchange and cooperation platforms, cooperation models, and key technologies, and serve as typical examples of China's water conservancy sci-tech achievements going global. Notably, the "International Sediment Initiative (ISI)", submitted by IRTCES, was selected as one of the 20 achievements.

ISI is one of the 17 flagship initiatives under the Intergovernmental Hydrological Programme (IHP) of the United Nations Educational, Scientific and Cultural Organization (UNESCO), established in 2002. The objective of ISI is to increase awareness of erosion and sedimentation dynamics and sediment issues in all spheres of water management by linking science with policy and management needs and supporting the global agenda for sustainable sediment management. ISI also has the mission to organize and promote international information exchange and provide direct access to policy makers in Member States while activating scientific and professional communities in all regions and countries concerned. ISI will promote the elaboration and monitoring of sediment data to develop appropriate methods and procedures in sediment management. This overall objective is also aligned with the priorities of the current IHP-IX phase, as well as the overall UNESCO-IHP mission, which concerns mobilizing scientific and policy-relevant expertise, knowledge and tools for informed decisions in addressing water challenges, as well as strengthening transdisciplinary water research by supporting research on methods for stakeholder involvement and knowledge integration.

Stanford study overturns long-held belief about plants and rivers



A view of seasonal flow in Shoshone Creek – an unvegetated meandering stream in Nevada.

Stanford scientists reveal that meandering rivers existed long before plants stabilized their banks, challenging a central narrative in geology.

A team of Stanford researchers is challenging a long-standing idea that the emergence of land plants about 500 million years ago dramatically altered the way rivers looked and behaved.

Rivers typically fall into two main categories: braided rivers, where several shallow channels weave around sandy bars, and meandering rivers,

where a single channel carves sweeping curves across the landscape. For decades, geologists believed that before plants evolved, rivers were mostly braided, and that meandering patterns only appeared once vegetation anchored riverbanks and trapped sediment.

The new findings, published in the journal *Science*, argue that this view misreads the geological record. The study shows that even rivers without vegetation can meander, leaving behind deposits that closely resemble those created by braided rivers. This distinction matters because the style of a river influences how long sediment, carbon, and nutrients remain stored in floodplains, shaping both ecosystems and climate over Earth's history.

"With our study, we're pushing back on the widely accepted story of what landscapes looked like when plant life first evolved on land," said lead author Michael Hasson, a PhD student in Mathieu Lapôtre's lab at the Stanford Doerr School of Sustainability. "We're rewriting the story of the intertwined relationship between plants and rivers, which is a significant revision to our understanding of the history of the Earth."

A drone view of the active channel and floodplain of Shoshone Creek in Nevada. The active river channel is moving through sediments it previously deposited. Former channel boundaries visible at the surface record the overall downstream migration of river bends, as Hasson et al. showed typically occurs in meandering rivers with bare, unvegetated banks.

The muddy floodplains of meandering rivers – dynamic ecosystems created over thousands of years by river overflow – are among the planet's most abundant non-marine carbon reservoirs. Carbon levels in the atmosphere, in the form of carbon dioxide, act as Earth's thermostat, regulating temperature over vast timescales. Accurately budgeting for the carbon caches created by meandering rivers could help scientists build more comprehensive models of Earth's ancient and future climate.

"Floodplains play an important role in determining how, when, and whether carbon is buried or released back into the atmosphere," Hasson said. "Based on this work, we argue carbon storage in floodplains would have been common for much longer than the classic paradigm that assumes meandering rivers only occurred over the last several hundred million years."

Where the river flows

To gauge vegetation's impact on river channel patterns, the researchers examined satellite imagery of about 4,500 bends in 49 current-day meandering rivers. About half of the rivers were unvegetated and half were densely or partly vegetated.

The researchers keyed in on point bars – the sandy landforms that develop on the inside bends of meandering rivers as water flow deposits sediments. Unlike the sandy bars that form in the middle of braided rivers, point bars tend to migrate laterally away from the centers of rivers. Over time, this migration contributes to meandering rivers' characteristically sinuous channel shapes.

Recognizing that these sandy bars form in different places based on river style, geologists for decades have measured the trajectory of bars in the rock record to reveal ancient river paths. The rocks, typically of sandstones and mudstones, provide evidence for divergent river styles because each deposits different kinds of and amounts of rock-forming sediment, giving geologists clues for reconstructing long-ago river geometries. If sandstones showed little variation in the angle of bar migration, geologists interpreted the bars as moving downstream, and thus that a braided river created the deposits.

Using this technique, geologists had noticed that rivers changed the way they behaved around the time that plants first evolved on Earth. This observation led to the conclusion that land plants made river meandering possible, for instance by trapping sediment and stabilizing riverbanks.

"In our paper, we show that this conclusion – which is taught in all geology curricula to this day – is most likely incorrect,", the paper's senior author and an assistant professor of earth and planetary sciences at the Doerr School of Sustainability.

By looking at modern rivers with a wide range of vegetation cover, the researchers showed that plants consistently change the direction of point bar migration. Specifically, in the absence of vegetation, point bars tend to migrate downstream – like mid-channel bars do in braided rivers.

"In other words, we show that, if one were to use the same criterion geologists use in ancient rocks

on modern rivers, meandering rivers would be miscategorized as braided rivers," Lapôtre said.

Rivers over time

The findings offer a provocative new window into Earth's past eons, upending the conventional picture of how rivers have sculpted continents. If indeed carbon-loaded floodplains were laid down far more extensively over history, scientists may need to revise models of major natural climate swings over time, with implications for our understanding of ongoing climate change.

"Understanding how our planet is going to respond to human-induced climate change hinges on having an accurate baseline for how it has responded to past perturbations," Hasson said. "The rock record provides that baseline, but it's only useful if we interpret it accurately."

"We're suggesting that an important control on carbon cycling – where carbon is stored, and for how long, due to river type and floodplain creation – hasn't been fully understood," he said. "Our study now points the way to better assessments."

Reference: "Vegetation changes the trajectory of river bends" by Michael Hasson, Alvise Finotello, Alessandro Ielpi and Mathieu G. A. Lapôtre, 21 August 2025, Science.

DOI: 10.1126/science.adv4939

(Source:https:/scitechdaily.com/)

Prof. Gary Parker lectures on morphodynamics of hanging ice dams at IWHR Global Vision Forum

On August 19th, 2025, Prof. Gary Parker from the University of Illinois at Urbana-Champaign, U.S., visited the China Institute of Water Resources and Hydropower Research (IWHR) and presented a seminar on "Morphodynamics of hanging ice dams: interaction between flow, sediment, frazil ice and a solid ice roof, and application to the Yellow River near the Hequ Gaging Station" at the IWHR Global Vision Forum. Prof. Hongling Shi, Deputy Division Chief of the International Research and Training Center on Erosion and Sedimentation (IRTCES), hosted the seminar. Approximately 100 participants attended, including experts and graduate students from IRTCES and IWHR, as well as other scholars who joined the event online.

In his presentation, Gary Parker emphasized that hanging ice dams drive river flow downward, thereby scouring holes in the sand bed. Such scouring endangers infrastructure like bridge piers and buried pipelines. Currently, research on how hanging ice dams affect riverbed evolution is insufficient, with relatively few relevant findings. The report elaborated on the physical mechanism of hanging ice dam formation in rivers, incorporating the transport mechanism of suspended frazil ice and the evolution mechanism of hanging ice dams. It also derived and established a governing equation accounting for the transport, deposition, and erosion of frazil ice, simulated the formation processes of hanging ice dams and scour holes, and applied the work to a field case on the Yellow River at the Hequ gaging station.

During the Q&A session, participating experts and scholars discussed the hydro-sediment-ice dynamic mechanism in rivers with hanging ice dams, along with relevant models and application cases. They agreed that this research expands the scope of traditional riverbed evolution studies—which only focus on hydro-sediment dynamics—by integrating hydro-sediment-ice dynamic processes. More importantly, it holds crucial guiding significance for disaster prevention and mitigation in cold-region rivers.

Scientists warn of hidden mercury threat in ocean due to human activity

BEIJING -- A new study has revealed that human activities and climate change are accelerating the release of mercury from the world's largest marine mercury reservoir -- continental shelf sediments.

The study, recently published in the journal Nature Sustainability, was led by researchers from Peking University in collaboration with experts from the United States, the United Kingdom and the Netherlands.

Mercury is a highly toxic global pollutant that can accumulate in food webs and pose serious risks to human health. Ocean sediments have long been considered a permanent storage site for mercury. However, the continental shelf, which holds the largest amount of mercury in the ocean, is now facing a rapidly increasing risk of mercury release.

By developing high-resolution datasets and coupled process-based models, the team precisely quantified the mercury storage capacity of global continental shelves and uncovered frequent disturbances caused by bottom trawling and climate-related processes.

The study shows that continental shelves store nearly 1,300 tonnes of mercury each year, six times more than previous estimates by the United Nations Environment Programme.

"Continental shelves act like the 'kidneys' of the ocean, effectively filtering toxic mercury from the

water and reducing threats to coastal fisheries and human health," said Wang Xuejun, a co-corresponding author of the study. "However, trawling and dredging activities are now acting like 'scalpels' that damage this vital function."

The research further quantified the direct impacts of human activities. Bottom trawling and dredging disturb over 5,000 tonnes of mercury in sediments annually, four times the amount buried each year.

At the same time, climate change is worsening the situation. Rising temperatures enhance the release of mercury from sediments. Model simulations indicate that with global warming of 1.5 to 5 degrees Celsius, the natural release of mercury from sediments into the water could increase by 6 to 21 percent by the end of the century.

Warmer oceans may also accelerate the breakdown of organic matter in sediments, further promoting mercury release. This process could combine with more frequent extreme weather events, leading to even greater mercury release, according to the study.

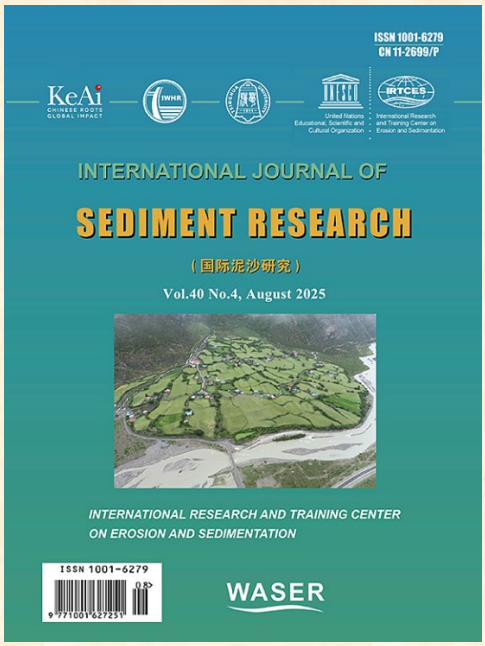
"When trawlers plow the seabed, they may accelerate the release of historical mercury buried for decades or even centuries," said Liu Maodian, another co-corresponding author. "Once this 'legacy mercury' is reactivated, it could re-enter food webs and pose renewed risks."

"Protecting the continental shelf mercury sink is closely linked to the United Nations Sustainable Development Goals, serving as a shield for human health and a guardian of marine ecosystems," Liu added. "Only by integrating mercury management, fisheries policies and carbon neutrality goals can we safeguard this last line of defense."

(Source: https://www.chinadaily.com.cn/a/202510/02/WS68de2a97a310f735438b3599.html)

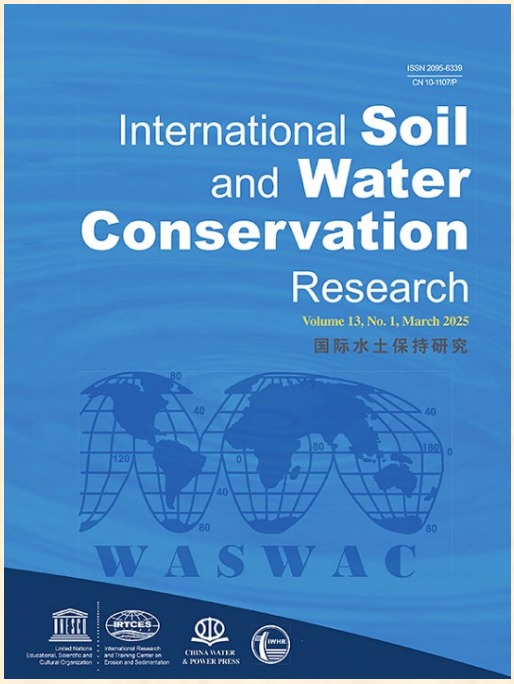
PUBLICATIONS

Contents of IJSR (Vol. 40, No. 4, 2025)



Full papers are available at ScienceDirect: https://www.sciencedirect.com/journal/international-journal-of-sediment-research with free access.

Contents of ISWCR (Vol. 13, No.3, 2025)



Pages 501-732(September 2025)

Free full papers and open access are available at ScienceDirect : https://www.sciencedirect.com/journal/international-soil-and-water-conservation-research.

COMING EVENTS

16th International Symposium on River Sedimentation (USA, December 14-17, 2025)

Date: December 14-17, 2025
Venue: Omaha, Nebraska, United States
Summary: The triennial International Symposium on River Sedimentation (ISRS) was initiated in 1980. Since its foundation, IRTCES has served as the permanent secretariat of ISRS. WASER was inaugurated at the 9th ISRS in 2004, and the ISRS has since become the official symposium of WASER. The objective of the ISRS is to provide a forum for scientists, engineers, researchers and decision makers to exchange ideas, research results and technical advances, , and to share experience and information related to the study of sediment and its management.
Organizer: University of Nebraska-Lincoln
Sponsors: World Association for Sedimentation and Erosion Research (WASER), International Research and Training Center on Erosion and Sedimentation (IRTCES)
Co-Sponsors: International Association for Hydro-Environment Engineering and Research (IAHR).....(to be invited)
Secretariat: University of Nebraska-Lincoln
Permanent Secretariat: IRTCES
Theme: Centennial of Modern Sediment Transport Mechanics
Topics:
1. Fundamentals for sediment transport (boundary layer flow, fluvial hydraulics, and hydrology)
2. Fundamentals of sediment transport (bed forms, bed load, and suspended load)
3. Experimental and computational sediment transport and fluvial processes
4. Watershed erosion and sedimentation
5. River erosion and sedimentation (case studies)
6. Scours abound hydraulic structures (case studies)
7. Reservoir sedimentation
8. Estuarine and coastal sediment transport
9. Seabed sediment transport
10. Environmental and ecological sediments with climate changes

URL: https://www.isrs2025.org/
Organization & Contacts:
Prof. Junke (Drinker) Guo
Department of Civil and Environmental Engineering
University of Nebraska—Lincoln
jguo2@unl.edu

Call for Papers: JHR Article Collection on Hydraulics of Sediment Transport and Scour, Guest-Edited by Subhasish Dey, Vice President, WASER Council (Deadline: 31 March 2026)

The Journal of Hydraulic Research announces a call for papers for a special article collection titled Hydraulics of Sediment Transport and Scour. This collection, guest-edited by Professor Subhasish Dey (Indian Institute of Technology Gandhinagar, India), aims to dissimilate the latest advances in theoretical, numerical, experimental, and field studies in this critical area of hydraulic engineering.
The submissions invited to address a wide range of topics, including but not limited to, various aspects of sediment transport, formation and evolution of bedforms, morphodynamics of meandering and braided channels, scour processes around hydraulic structures (e.g., piers, abutments), downstream scour, scour below pipelines, and scour in contractions.
While fundamental research remains the primary focus, contributions exploring innovative applications, new physical insights, and emerging phenomena in sediment transport and scour are highly encouraged. The collection welcomes original research articles, comprehensive reviews, and forward-looking perspectives that advance understanding and inspire future innovation in this dynamic field.
Submission Deadline: 31 March 2026
For detailed submission guidelines and more information, please visit the collection webpage:
https://www.iahr.org/index/detail/1930

River Flow 2026, The 13th International Conference on Fluvial Hydraulics (Greece, June 29–July 3, 2026)

Date: June 29 - July 3, 2026
Venue: Thessaloniki, Greece
Summary: Since its inception in 2002, under the esteemed Fluvial Hydraulics Committee of the International Association for Hydro-Environment Engineering and Research (IAHR), the River Flow Conference Series has proudly stood as a premier global platform for the exchange of pioneering research and best practices in fluvial hydraulics and river engineering.
RiverFlow 2026 invites you to be part of a dynamic assembly of professionals, scholars, and industry practitioners in a vibrant forum dedicated to exploring the cutting-edge experimental, theoretical, and computational advances in river hydraulics and sediment transport processes, covering a wide range of themes spanning the areas of hydro-environment, geosciences and eco-bio-geomorphology.
Organizers: IAHR, Aristotle University of Thessaloniki, Division of Hydraulics and Environmental Engineering
Theme: Steering the future of hydro-environment research and practice
Topics:
1. Fundamental Flow Processes
2. Sediment Transport Dynamics and River Evolution Processes
3. Flow and Sediment Transport Through Hydraulic Structures
4. Eco-Hydraulics and River Re-naturalization
5. Pollutant Transport Processes
6. River Systems and Resilience Under a Changing Climate
7. Integrated River Basin Management

Contacts:
RiverFlow2026@civil.auth.gr
URL: https://riverflow2026.web.auth.gr/

9th International Conference on Estuaries and Coasts (China, December 2026)

Date: December 2026
Venue: Qinzhou, China
Organizers: Qinzhou Municipal People's Government, Department of Water Resources of Guangxi Zhuang Autonomous Region, Department of Transport of Guangxi Zhuang Autonomous Region

Sponsors: International Research and Training Center on Erosion and Sediment Research (IRTCES);
Co-sponsors: World Association for Sedimentation and Erosion Research (WASER), China Institute of Water Resources and Hydropower Research (IWHR), International Association for Hydro-Environment Engineering and Research (IAHR), Guangxi University; Guangxi Normal University, Beibu Gulf University, and Pinglu Canal Group Co., Ltd.
Summary: The International Conference on Estuaries and Coasts (ICEC) is a triennial event initiated by the International Research and Training Center on Erosion and Sedimentation (IRTCES). Eight such conferences have been held in Hangzhou and Guangzhou, China; Sendai, Japan; Hanoi, Vietnam; Muscat, Oman, Caen, France, Shanghai, China, and Quebec City, Canada in 2003, 2006, 2009, 2012, 2015, 2018, 2021 and 2024, respectively. With support from related international associations, and with the participation of experts and scholars worldwide, the ICEC has attracted wide attention and has become an important and popular event. The ICEC provides an opportunity for scientists, engineers, researchers and decision-makers to exchange ideas, research results and advanced techniques, and develop collaboration and friendships. The 9th International Conference on Estuaries and Coasts (ICEC 2026) will be held in Qinzhou, China during December, 2026. The ICEC 2026 will provide a venue for intellectual and enlightening discussions of ideas. The conference program will cover broad topics.
Theme:
Estuaries and Coasts under Modern Civilizations
Topics of the Conference:
1. Hydrodynamics and Sediment Transport in Estuaries and Coastal Zones: Fundamentals and Modeling
2. Monitoring, Early Warning and Forecasting of Estuarial and Coastal Hazards
3. Eco-environment Protection in Estuaries and Coastal Zones
4. Climate Change, Human Activities and Their Impacts on Estuaries and Coasts
5. Canal Constructions in Estuaries and Coastal Zones
6. Integrated and Intelligent Management of Estuaries and Coastal Zones
7. Morphological Evolutions of Estuaries, Coasts and Deltas
8. History, Culture, Socioeconomics and Policy on Estuaries and Coasts
9. Impacts of Watershed Developments on Estuaries and Coastal Zones
URL: https://ICEC2026.scimeeting.cn

11th International Symposium on Environmental Hydraulics (ISEH 2027) (USA, June 1-4, 2027)

Date: June 1-4, 2027
Venue: The University of Iowa, Iowa City, IA USA
Invitation: We are pleased to announce that the 11th International Symposium on Environmental Hydraulics (ISEH) will be held in Iowa City, IA, USA on the 1st – 4th June 2027. Sponsored by the International Association of Hydro-Environment Engineering and Research (IAHR), the 11th ISEH will build on the success of previous ISEH symposia in bringing together international experts to present and discuss new research and technical innovations in various areas of environmental fluid dynamics research.
The symposium will be held within the University of Iowa campus, providing an ideal setting in which to share knowledge and to meet old and new friends.
The symposium will focus on the latest advances in experimental and computational methods that can be used to deepen our understanding and capacity to predict flow and the associated fluid-driven ecological processes, anthropogenic influences (e.g., heat, dissolved and suspended organic/inorganic material), sediment transport and morphodynamic processes in rivers, coastal regions and reservoirs. We hope the ISEH symposium will provide a productive platform for fruitful scientific discussions, opportunities for younger scientists and practitioners to interact and exchange ideas with established researchers and spark new collaborations among participants. In particular, cross-fertilization among research groups, emergence of new concepts and approaches, and interdisciplinary interactions are expected to be highlights of the ISEH symposium.
We very much look forward to welcoming you in Iowa City. (Prof. George Constantinescu, Symposium Chair)
URL: https://iseh.conference.uiowa.edu/
Contact
ISEH Conference
College of Engineering
Iowa City, Iowa 52242
Email: iseh-2027@uiowa.edu
Phone: +01 319 594 2817

World Association for Sedimentation & Erosion Research

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