WASWAC

HOT NEWS

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Editor: Pengfei DU

WORLD ASSOCIATION OF SOIL AND WATER CONSERVATION

China launches research journal on river systems

Editors-in-Chief: Hao Wang, Asit K Biswas and Wenhong Cao
Online ISSN: 2750-4867

China has launched a new academic journal called **River** to publish the latest findings on river systems and hydropower research.

The announcement was made at the Global Water Forum in Beijing on August 24, 2022. The editorial staff of the journal and over 100 industry experts from China and abroad attended the forum both in-person and online. They discussed the challenges facing global river management and shared their views on ways to preserve rivers.

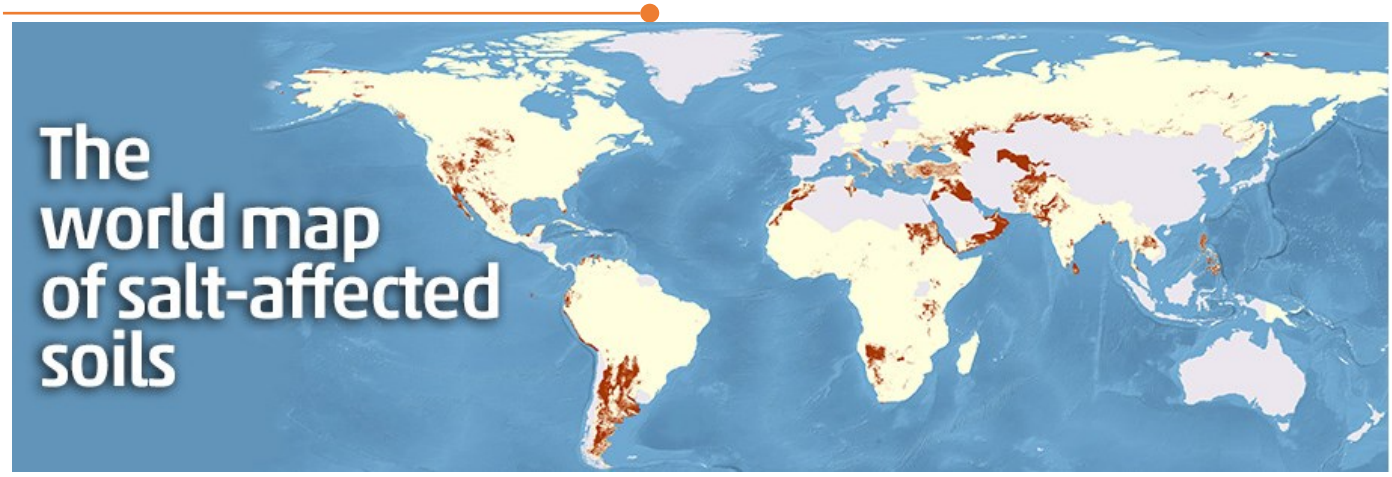
According to Kuang Shangfu, chairperson of the journal and president of the China Institute of Water Resources and Hydropower Research, the journal is the platform where all kinds of knowledge, from natural and social to topics involving water resources, will be discussed.

River welcomes research spanning the following areas:

- Water resources, water environment, water ecology, water disaster, hydraulics, irrigation
- Geotechnical engineering and dam construction technique
- Estuarine and offshore engineering

The journal's official website: *https://onlinelibrary.wiley.com/journal/27504867*

The world map of salt-affected soils



The first ever country-driven Global Map of Salt-affected Soils (GSASmap) V1.0.0 has just been released!

The Global Map of Salt-Affected Soils (GSASmap) is a product containing contributions from over 118 countries with 257, 419 locations containing measured soil data. More than 350 national experts were involved in the harmonization of its input data and methods for mapping salt-affected soils (SAS) and were trained in the state of the art methods for digital soil mapping. Every country then produced their maps following the agreed technical specifications (6). This participatory country-driven process offers more opportunities for future periodic update, which is an important aspect that has been missing in previous global SAS information.

The map represents spatial distribution of SAS information at two depth intervals: 0-30 cm and 30-100 cm including EC, ESP, pH, and classes of salt-affected soils.

The GSASmap represents the spatial distribution of SAS with ECe>2 dS/m, ESP>15% and pH > 8.2 at two depth intervals (0-30 cm and 30-100 cm). With the current information from 118 countries covering 85% of global land area, it shows that more than 424 million hectares of topsoil (0-30 cm) and 833 million hectares of subsoil (30-100 cm) are salt-affected:

- 85% of salt-affected topsoils are saline, 10% are sodic and 5% are saline-sodic
- 62% of salt-affected subsoils are saline, 24% are sodic and 14% are saline-sodic.

These estimates based on the submitted data show that more than 3% of global topsoils and more than 6% of global subsoils are affected by salinity or sodicity. More than two thirds of global SAS are found in arid and semi-arid climatic zones:

- 37% of SAS are located in arid deserts
- 27% of SAS are distributed in arid steppe

Details: *https://www.fao.org/global-soil-partnership/gsasmap/en*

Soil health helps promote climate resilience

By Staff Reporter

Soil is one of the earth's most complex ecosystems and is critically important to future food and nutritional security worldwide. Healthy soil stores carbon and retains more moisture, improving resilience during dryer seasons. Its ability to hold more water also reduces the impacts of toxic runoff that depletes essential nutrients.

Even politicians in the United States have recognized soil's effects on food production, bringing 166 bills related to soil health up for debate between 2015 and 2018.

In Africa, where the total population reached over 1.4 billion in 2022 — an uptick from 811 million people in 2000 — improving soil health is more vital than ever, especially as extreme heat and other climate change impacts ravage agricultural lands and send nations into dire nutritional need.

With soil health essential to supplying African nations with a robust food economy, adopting soil conservation management strategies must be a priority to guarantee climate resilience.

The State Of Soil in Africa

The growing global population's changing demands suggest that cereal and livestock prod-

uction may need to boost operations between 60% and 100% by 2050. As a result, sub-Saharan Africa will have to invest in agricultural research, technology and infrastructure to safeguard their food security.

Africa's agricultural sector currently faces severe challenges associated with dire temperatures and prolonged droughts. According to the United Nations's 2018 report, The State of Food Security and Nutrition in the World, developing countries have experienced twice as many extreme climate events since the 1990s — approximately 213 occurring annually between 1990 and 2016.

Of course, higher temperatures result in water shortages, dryer air and inadequate soil conditions for crop production, poorer animal welfare and worsening labor productivity.

Using synthetic pesticides and fungicides to combat pest infestations and disease also reduces soil fertility significantly. Soil contains rich taxa of about 10 to 100 million organisms while driving unique natural processes like nutrient cycling, maintaining soil structure, carbon sequestration and natural pest and disease control.

When farmers excessively apply pesticides, fertilizers and fungicides to their crops, the chemicals seep into the ground, altering the soil nutrients and reducing the mortality of organisms responsible for maintaining soil health. Considering it takes about 5,000 years to form six inches of topsoil, decreasing widespread pesticide use in Africa's agricultural sector will help stimulate soil fertility and create a more climate-resilient food source.

Soil Solutions for Climate Resilience

Farmers in sub-Saharan Africa can take several measures to promote soil health for climate resilience, such as a more holistic approach to improving soil quality, nutrients and irrigation practices.

For instance, in Mozambique — where catastrophic cyclones resulted in significant flooding and crop loss in 2019 and 2021 — farmers have had to rebuild their soils from salinization and erosion. Their methods have comprised better crop rotation, intercropping and limiting pesticide applications to site-specific areas to prevent soil nutrient depletion.

In turn, larger soil areas can recover and accumulate organic matter over time. Organic matter boosts bacterial and microbial growth, allowing soils to hold more moisture and withstand erosion.

Embracing soil management practices is another way farmers can improve crop productivity and may entail integrated pest management, reduced tillage, organic soil inputs, companion planting and expanding crop varieties.

Only 3% to 18% of African farms have implemented proper soil management strategies, mainly on a larger, commercial scale. Meanwhile, smallholder farmers struggle to adopt soil conservation practices due to weak agricultural policies, limited monetary, institutional and technological support and conflicting advice about soil health and climate resilience.

More substantial policy interventions, advanced soil science research, farming incentives and greater dissemination of resources are necessary if the broader agricultural sector is to execute a climate-smart recourse for healthier soil in Africa.

Africa's Food Security Depends on Soil Health

Climate change shows no sign of slowing down as temperatures heat up and an influx of extreme flooding and weather events are likely to occur soon. Feeding Africa's growing population amid a climate-stricken planet requires improved soil quality for climate-resistant crop yields.

Sources:

https://farmersreviewafrica.com/soil-health-helps-promote-climate-resilience/

Anti-desertification efforts by CSCEC unit in Yellow River basin bear fruit

By Zhuang Qiange

Employees of Third Construction Co Ltd of China Construction First Group, a unit of China State Construction Engineering Group Co Ltd, lay sod in the Ulan Buh Desert, Inner Mongolia autonomous region, China.

Once a befouled, odorous body of water that was the result of decades of mining, Ulansuhai Nur, the biggest lake in the Yellow River basin located in Urad Front Banner of Bayannur, Inner Mongolia autonomous region, is taking on a brand new view of a bird paradise laden with various green plants and lucid water.

Shi Zhigang is a local farmer who settled many years ago near the Ulan Buh Desert, where desertification issues were severe. This worsened the ecological conditions of the Ulansuhai Nur and even the Yellow River. "Those were the days when sandstorms always kept us from going outdoors. When the storms darkened the sky, we couldn't even open the doors and windows that were blocked by sand," Shi said.

"Aside from the impact from the Ulan Buh Desert, what made protection work even harder is that the area is confronting impacts brought by the environmental issues of neighboring areas, such as soil erosion at Wula Mountain and landslide issues in nearby mining areas," said Jia Haiyuan, project manager with Third Construction Co Ltd of China Construction First Group (CSCEC1B3), a unit of China State Construction Engineering Group Co Ltd.

With the area facing tough and numerous environmental issues, Ulansuhai Nur has an area "awaiting cleanup" of its 14,700 square kilometers, making it the "hardest nut to crack" among its peers, which was exactly what the company was facing back in June 2019, when it came to work with the local government to make fundamental changes to the area.

"Our first step was dealing with the sand, as reducing the amount of sediment that flows into the Yellow River is a key start to the overall project. To this end, we have to restore the soil-fixing capacity of the whole area, and that's why we have been planting trees and grasses constantly," Jia said, adding that the plants they used to fix soil can also generate income for participating farmers, such as cistanche bushes and fruit trees.

What's more, the project team planned a welfare forest on nearly 670 hectares of land to help with poverty alleviation, and guided local herdsmen and villagers to plant fruit trees and to steward the land. So far, 1,200 local villagers have taken part in forestation efforts, with 100 residents living in poverty now earning an additional 8,000 yuan ($1,185) monthly during harvest seasons.

Together with 1,533 hectares of economic forest planting, CSCEC1B3 said these efforts will effectively help prevent soil erosion and improve the ecological environment of the middle and lower reaches of the Yellow River.

The project has achieved remarkable results. The team led by Jia has laid about 32 million sod squares in the desert, planted 13.32 million haloxylon saplings, laid 157 kilometers of sand-traversing roads, repaired an area of 66.505 square kilometers of mines and planted 1,963 hectares of trees.

The ecology of the Yellow River is now turning for the better and has seen major improvements, with biodiversity effectively improved. After the completion of this project, a total of 1 million cubic meters of sand will be withheld from flowing into the Yellow River every year. The water ecological security of the middle and lower reaches of the Yellow River will be further enhanced and guaranteed.

Sources: *https://www.chinadaily.com.cn/a/202208/05/WS62ec6ea3a310fd2b29e706eb.html*

Not just desert dust: anthropogenic air pollution impacts health and climate in the Middle East

A visible layer of air pollution stretches out across the sea. Photograph taken from the research vessel during the AQABA campaign. Credit: © 2022 AQABA project

Desert dust was assumed to be the primary contributor to elevated air pollution across the Middle East. Now, an international team of scientists including researchers from King Abdullah University of Science & Technology (KAUST) has shown that pollution from anthropogenic sources contributes to health risks and is an important climate factor across the region.

"The conventional thinking was that dust carried by storms over the Arabian Peninsula dominated air quality over the region," says Sergey Osipov from the Max Planck Institute (MPI) for Chemistry. His team worked on the project with KAUST's Georgiy Stenchikov and Alexander Ukhov, and colleagues from King Saud University and The Cyprus Institute.

"Our research has demonstrated that hazardous fine particulate matter, which is distinct from the less harmful coarse desert dust particles, is largely anthropogenic in origin and is a leading health risk factor, as well a significant contributor to climate change," Osipov says.

Air pollution accounts for around 745 per 100,000 excess deaths per year in the region, says Osipov, which is similar to other leading health risk factors, such as tobacco smoking and high cholesterol.

Previous modeling studies on air quality across the Middle East tend to overestimate the fraction of the desert dust, obscuring the contribution to poor air quality from anthropogenic sources, adds Osipov. "Such models produce semi correct answers for the wrong reason, because they poorly represent a significant component of anthropogenic fine particle pollution in the region."

The lack of observation data, combined with a poor representation of emission sources, has "significantly hindered our ability to model the chemical composition of the atmosphere in the region," says Osipov.

To address this scarcity of data, the researchers, led by Jos Lelieveld from MPI for Chemistry, collected measurements taken at sea as part of the international collaboration, called Air Quality and climate in the Arabian Basin (AQABA). The measurements, collected over two months during the summer of 2017, covered various ambient conditions ranging from pristine in the remote atmosphere to heavy pollution and dust storms.

Analysis of the AQABA data provided comprehensive constraints on the dust size distribution, which allowed a more realistic simulation of the mass flux and life cycle of dust. As a result, the team was able to model the realistic chemical composition of the aerosol across the entire size range.

"We found that particulate matter from anthropogenic sources accounted for around 53 percent of aerosol visible optical depth and induces a radiative forcing on the climate equivalent to that of the natural dust in the region," says Osipov. "Our study highlights how anthropogenic air pollution is a leading health risk and important climactic factor across the Middle East."

Source:

https://scitechdaily.com/no-just-desert-dust-anthropogenic-air-pollution-impacts-health-and-climate-in-the-middle-east/

The Arctic is warming even faster than scientists realized

By Carolynn Gramling

Arctic regions, such as Greenland's capital city of Nuuk, have seen temperatures warm four times as fast as the rest of the planet, on average. HADA AJOSENPÄÄ/FINNISH METEOROLOGICAL INSTITUTE

The Arctic is heating up at a breakneck speed compared with the rest of Earth. And new analyses show that the region is warming even faster than scientists thought. Over the last four decades, the average Arctic temperature increased nearly four times as fast as the global average, researchers report August 11 in Communications Earth & Environment.

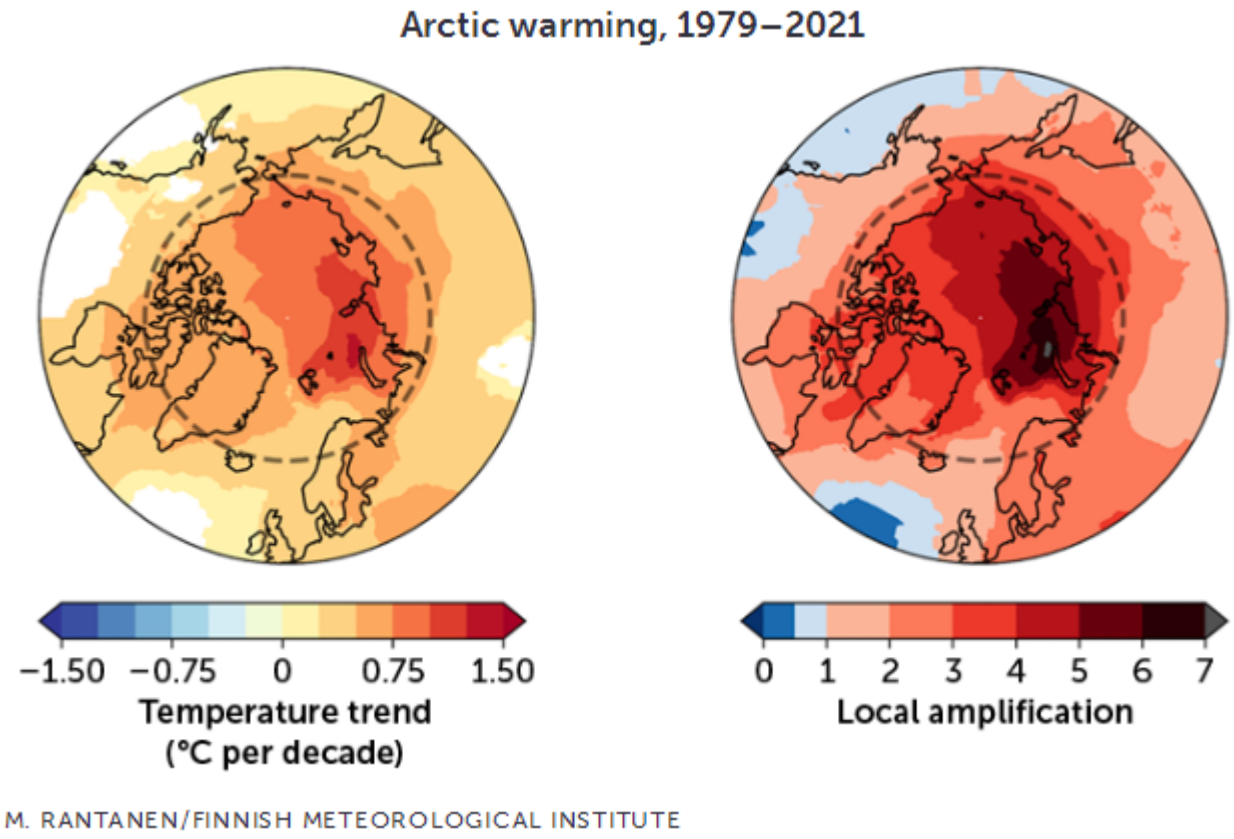
And that's just on average. Some parts of the Arctic Ocean, such as the Barents Sea between Russia and Norway's Svalbard archipelago, are warming as much as seven times as fast, meteorologist Mika Rantanen of the Finnish Meteorological Institute in Helsinki and colleagues found. Previous studies have tended to say that the Arctic's average temperature is increasing two to three times as fast as elsewhere, as humans continue causing the climate to change.

To calculate the true pace of the accelerated warming, a phenomenon called Arctic amplification, the researchers analyzed observational data from 1979 to 2021 (SN: 7/1/20).

Globally, the average temperature increase over that time was about 0.2 degrees Celsius per decade. But the Arctic was warming by about 0.75 degrees C per decade.

Even the best climate models are not doing a great job of reproducing that warming, Rantanen and colleagues say. The inability of the models to realistically simulate past Arctic amplification calls into question how well the models can project future changes there.

It's not clear where the problem lies. One issue may be that the models are struggling with correctly simulating the sensitivity of Arctic temperatures to the loss of sea ice. Vanishing snow and ice, particularly sea ice, are one big reason why Arctic warming is on hyperspeed. The bright white snow and ice create a reflective shield that bounces incoming radiation from the sun back into space. But open ocean waters or bare rocks absorb that heat, raising the temperature.



Arctic warming 1979-2021 (*The gray dotted line indicates the border of the Arctic Circle.)*

Source: *https://www.sciencenews.org/article/arctic-warming-faster-earth-climate-change*

World Large Rivers Conference 2023

Central Theme:

RIVERS IN A CHANGING WORLD

Key topic 1:

Hydrology, Hydraulics and Hydraulic Impacts

1a. Hydrology and hydraulics

1b. Water resources and availability

1c. Influence of climate change on large basin hydrology

Key topic 2:

Sediment Transport and River Morphology

2a. Sediment transport and material fluxes

2b. River morphology and morphodynamics

2c. Influence of climate change on sediment transport and river morphology

Key topic 3:

River Pollution, Ecology and Restoration

3a. River pollution and water quality

3b. River ecology and river restoration

3c. Influence of climate change on ecology and restoration

Key topic 4:

Integrated River Basin Management

4a. Human uses, conflicting demands and stresses on large rivers

4b. Climate change – water security and natural disasters

4c. Hydropower, navigation, flood control and protection, water resources and irrigation

4d. Integrated management and shared benefits

Details: *https://worldslargerivers.boku.ac.at/*

15th International Symposium on River Sedimentation

ISRS 2023

Theme:

Sustainable Sediment Management in a changing Environment

Topics:

- Sediment transport
- Reservoir sedimentation
- River morphodynamics
- Coastal morphodynamics
- Ecomorphodynamics
- Sediment related disaster
- Plastic in river and coastal systems
- Interaction between sediment dynamics and hydraulic structures
- Integrated Sediment Management at the River Basin Scale
- Social, economic & political problems related to sediment and water management

Sponsors:

WASER

UNESCO
United Nations Educational, Scientific and Cultural Organization

IRTCES
International Research and Training Center on Erosion and Sedimentation

Co-Sponsor:

IAHR AIRH
International Association for Hydro-Environment Engineering and Research
Hosted by Spain Water and IWHR, China

Details: *https://www.isrs2022.it/#sponsor*

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Download:

https://www.sciencedirect.com/journal/international-soil-and-water-conservation-research/vol/10/issue/4

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