WASWAC

HOT NEWS

ISSUE 12, 2023

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WASWAC

CONTENTS

Editor: Pengfei DU

Assistant Editors: Li LI, Donghao HUANG, Xiaofei NIE, Silian PAN

The Announcement of the WASWAC 4th International Youth Forum on Soil and Water Conservation (IYFSWC)

In order to help the youth worldwide to play greater roles in the scientific research, technological development, and demonstration & popularization of soil and water conservation, encourage and support the young generation to undertake the historical responsibility entrusted by the times, and to achieve sustainable development in soil and water conservation, World Association of Soil and Water Conservation (WASWAC) will continue to organize the International Youth Forum on Soil and Water Conservation (IYFSWC) in Shenyang in this coming September, following the first three sessions, which were held successfully in Nanchang, China in October 2015, in Moscow, Russia in August 2018, in Noor, Iran in October 2021.

WASWAC will continue to evaluate the Outstanding Youth Paper (See Appendix 1 for details), which is set up by WASWAC especially for the outstanding young researchers under the age of 40. The paper passed evaluation will have chance to be published in the official journal of WASWAC – International Soil and Water Conservation Research, and the winners will also be able to obtain a certificate issued by WASWAC and a USD 1000 honorarium.

As an important platform of academic progress presentation and to research ideas exchange, we sincerely invite worldwide scholars, students, and relevant enterprises engaged in the scientific research, technology development, management, teaching and training and engineering design of soil and water conservation, to participate in this forum to share your latest research or technology progress, with oral presentation or poster display.

TIME & VENUE

September 21-23, 2024, Shenyang Agricultural University, Shenyang, China

THEME

Bringing Youth Together - Leading the Future of Soil and Water Conservation

TOPICS

Soil and water conservation under climate change

Soil erosion mechanisms and modeling

Evaluation of soil erosion at regional scale

New technology of soil and water conservation

Soil and water conservation in production and construction projects

Intelligent soil and water conservation

Carbon sinks for soil and water conservation

Soil and water conservation biodiversity

Soil and Water Conservation Policy, Education and Popularization of Science

PROGRAM

Plenary Lectures by Keynote Speakers

Oral and Poster Sessions

Field Excursion

Special Activities for the Youth

Outstanding Youth Paper Evaluation

KEY DATES

Registration Opening	March 1, 2024
Abstract and registration form (See Appendix 2) Submission Deadline	March 31, 2024
Outstanding Youth Paper Application (with full paper inclusive) Deadline	April 30, 2024

(Participants who do no want to apply for the Outstading Youth Paper, do not need to submit full paper)

FEES

General Participant: 200 (student with valid certificate), 300 (regular) in USD.

(Fee includes Breakfast, Lunch, Dinner, e-proceedings, Coffee Breaks and Welcome Reception)

CONTACTS

The WASWAC Secretariat

Dr. Pengfei DU, waswac@foxmail.com

The Forum Secretariat

Dr. Donghao HUANG, Dr. Hui LIU, Dr. Huazheng LIU, IYFSWC_4th@syau.edu.cn

INFORMATION

http://www.waswac.org.cn

Appendix 1

WASWAC Youth Outstanding Paper Evaluation

To encourage early-career scientists to contribute to soil and water conservation in the world, the WASWAC has evaluated the WASWAC Youth Outstanding Paper 4 times since 2015. Together with the WASWAC 4th International Youth Forum on Soil and Water Conservation (IYFSWC), which will be held from September 21 to 23, 2024 in Shenyang, China. The application for the award is open from now.

This award will be presented to early-career scientists of outstanding research papers on soil and water conservation. The award consists of a Certificate from the WASWAC and a $1000 (USD) honorarium financially supported by the Beijing Datum Technology Company. In the case of multi-author papers, the award will be presented only to the first author.

Eligibility

◇ The first author of the manuscript should be in their early career in research. In principle, preference will be given to scientists who are not beyond 40 years old by December 31, 2024.

◇ The papers should have creativity and originality, as reflected in new insights, interpretations, facts, innovations, methods, or applications.

◇ The papers should be written in English and should be clear, concise, comprehensible, and jargon-free, such that the papers are easy to read and understand.

◇ The papers submitted for consideration for the evaluation should not have been previously published, and the authors should submit the paper with an oral presentation at the 4th Inter-

national Youth Forum on Soil and Water Conservation (IYFSWC).

◇ The papers passed evaluation must be submitted to the International Soil and Water Conservation Research (ISWCR) which is the official journal of WASWAC and SCIE indexed (IF 6.4) (http://www.keaipublishing.com/en/journals/international-soil-and-water-conservation-research/). The final publishing will go through peer reviewing follow the journal publishing procedures and rules.

◇ The previous awardees in 2015, 2016, 2018 and 2021 are ineligible for this evaluation.

Procedure

◇ Application: The author should submit the abstract along with the application form by March 31, 2024. The full paper must be submitted on or before April 30, 2024.

◇ Nomination and Peer-review process: The Award Committee will screen and nominate the research papers that will undergo the peer-review process by the experts.

◇ Evaluation and selection: Based on the results of the peer-review process, the Evaluation Committee will select the Outstanding Youth Paper Awardees.

Significant Dates

◇ Submission of application form / Paper abstract: March 31, 2024

◇ Submission of Full paper: April 30, 2024

◇ Nomination announcement: May 31, 2024

◇ Final awardees announcement: September 2024

Application procedure

Send your application form with abstract/full paper to the application directly to: IYFSWC_4th@syau.edu.cn, and copy to: waswac@foxmail.com and iswcr@foxmail.com

Appendix 2

Application form to attend the 4th WASWAC

International Soil and Water Conservation Youth Forum

First name		Last name	
Gender		Date of birth	
Mobile		Email	
Affiliation			
Post address			
Student	□Yes □No		
Professional field			
Title of presentation			
Type of presentation	□Oral □Poster Note: Participant who wants to apply for the *outstanding youth paper*, must submit full paper before April 30, 2023, and must report orally.		
Apply for the outstanding youth paper	□Yes □No		
Abstract	200 – 350 Words		

Note:
(1) Please submit your application form with abstract enclosed to IYFSWC_4th@syau.edu.cn and waswac@foxmail.com before March 31, 2024. Subject line for submission email: WASWAC 4 IYFSWC_YOUR LASTNAME

(2) For participants who apply for the outstanding paper, pleases submit your application form with abstract as requested above, and also, please prepare full paper according to the guide for author of the *International Soil and Water Conservation Research* :
https://www.keaipublishing.com/en/journals/international-soil-and-water-conservation-research/guide-for-authors/

The full paper should be also submitted to IYFSWC_4th@syau.edu.cn and copy to waswac@foxmail.com and iswcr@foxmail.com before April 30, 2024. Subject line for submission email: WASWAC 4 IYFSWC_YOUR LASTNAME_ WASWAC Outstanding Youth Paper

This table can be downloaded in :

http://www.waswac.org.cn/waswac/uploadfile/2024/02/01/20240201144154673.doc

Erosion potential method (EPM)

Description: Most of the modelling applications are using Universal Soil Loss Equation (USLE)-type models. In the activities of EU Soil Observatory working group on erosion, it is undelined that the soil erosion modelling community should also make a step towards intercomparison of global multi-models, gaining new insights from the advantages and disadvantages found in the compared models. Here, we evaluate the applicability of the Erosion Potential Model (EPM) and its modified version (mEPM) for the estimation of the gross and net erosion rates at a global scale. The sensitivity analysis shows that the model results have the highest variability due to the soil protection (land cover) coefficient followed by the soil erodibility parameter. The models' evaluations indicate that that the EPM cannot be applied to cold regions while the mEPM overcomes this issue. The erosion rates based on the EPM were 1.5–2.5 times larger than the ones obtained from the mEPM. Increasing the number of catchment properties as inputs to the model may help in improving the performance of the tested EPM and mEPM. Moreover, a comparison of net soil losses by mEPM with long-term suspended sediment yield data for 116 catchments located around the globe indicates a median bias of less than 10%, although the bias for around 1/3 of catchments was above 100%. Furthermore, a direct comparison with other soil erosion models such as USLE-type models is not possible since the EPM and mEPM do take into consideration other processes such as soil slumps and gully erosion and not just sheet and rill erosion. Therefore, as expected, the gross erosion rates by the EPM and mEPM are higher compared to the USLE-type models. Hence, the mEPM, despite its limitations, could be regarded as an interesting approach for the describing erosion processes around the globe and should be further tested using small- and medium-sized catchments from various climate zones.

Spatial coverage: Global

Measurement Unit: Integer pixel values corresponding to soil losses as t ha-1 yr-1.

Temporal coverage: 2010

Reference: Bezak, N., Borrelli, P., Matjaž M., Auflič M., Panagos, P., 2024. Towards multi-model soil erosion modelling: An evaluation of the erosion potential method (EPM) for global soil erosion assessments. CATENA 234, 107596. DOI:10.1016/j.catena.2023.107596

Details:

https://esdac.jrc.ec.europa.eu/content/erosion-potential-method-epm

Call for soil erosion plot data in EU

What is EU_ERPlot?

It is a collaborative network targeting soil erosion by water data from European field experiments. The aim of this network is to reach out to Researchers from European institutions to come together and create an open-access database (EU_ERPlot) of soil erosion records collected at plot scale, through a series of diverse land use and land cover features across Europe. This is an action promoted by the EU Soil Observatory Technical Working Group on Soil erosion.

EU_ERPlot database will allow us to:

- ◇ Improve the understanding of soil erosion processes across multiple environmental, management and climate conditions.
- ◇ Aid model development though the development of new inputs and model validation.
- ◇ Preserve past and present data records, in a harmonized format and updatable platform.
- ◇ Make data open and accessible to the community.

How can I contribute?

Contributions can be made to the database by downloading and completing the form available in the ESDAC data portal (here). We welcome data submissions from all potential contributors across the European continent who wish to share access to their soil erosion measurements. Upon the completion of the form, data submissions will be screened, harmonized, and then included in the first EU_ERPlotdatabase.v1. As a result, any contributor will be co-author of the first data publication (see examples of past collaborative actions).

Template submissions can be made by contacting the listed data manager through the contact details listed in the ESDAC data portal. Data manager: diana.simoes-vieira@ec.europa.eu

What type of soil erosion data are we talking about?

In general terms, all soil erosion data records made at any time-step and known timeframe, at plot scale with known area, and known field conditions, are welcome (see form for more details). The data coverage includes countries within Europe, European Union and Candidates, and Horizon Europe. Moreover, published and unpublished data, as well as past and recent data measurements, are encouraged to be submitted with the highest resolution possible.

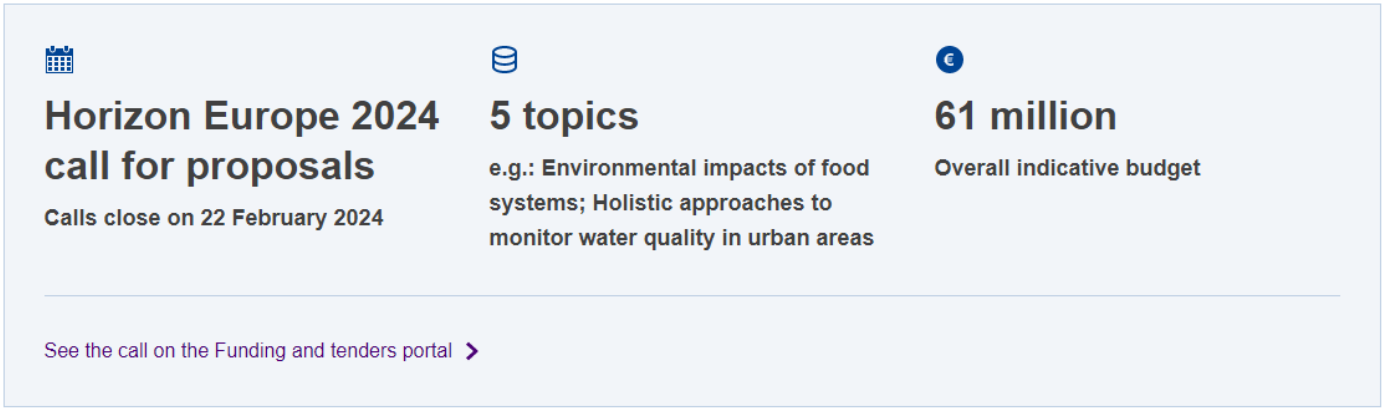
For more details:

https://esdac.jrc.ec.europa.eu/themes/european-soil-erosion-field-measurements-plot

Clean environment and zero pollution

Under Horizon Europe, the European Commission funds research and innovation developing solutions to address pollution and to guarantee clean and healthy soils, air, fresh and marine water for all.

There are single-stage and two-stage calls. For the single-stage call for proposals, applicants submit a final proposal by the call deadline. For the two-stage call for proposals, applicants submit an outline application (maximum 10 pages) by the first deadline which will be evaluated against only two award criteria: 'Excellence' and 'Impact'. Successful applicants are invited to submit a full proposal by the second deadline, which will be evaluated against the full set of award criteria. First-stage proposals of two-stage submissions will be evaluated blindly, and applicants may not disclose their identity in Part B of their proposal.



Details:

https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-search;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=0,1,2,8;statusCodes=31094501;programmePeriod=null;programCcm2Id=43108390;programDivisionCode=43121563;focusAreaCode=null;destinationGroup=45355328;missionGroup=null;geographicalZonesCode=null;programmeDivisionProspect=null;startDateLte=null;startDateGte=null;crossCuttingPriorityCode=null;cpvCode=null;performanceOfDelivery=null;sortQuery=sortStatus;orderBy=asc;onlyTenders=false;topicListKey=topicSearchTablePageState

Assessment of gully erosion susceptibility using different DEMderived topographic factors in the black soil region of Northeast China

A typical gully within the study area

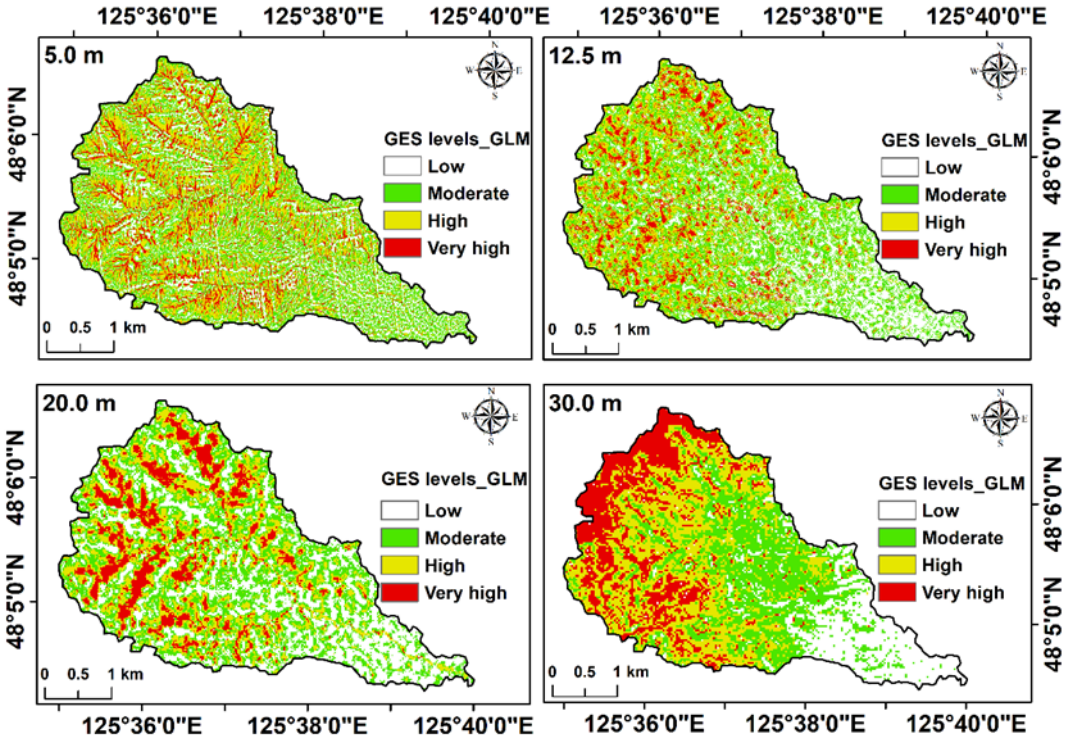
A paper published in the International Soil and Water Conservation Research, demonstrated that GES assessment with machine learning methods can successfully identify areas prone to gully erosion, providing reference information for future soil conservation plans and land management. In addition, pixel size (resolution) is the key consideration when preparing suitable datasets of feature variables for GES assessment.

This study aimed to identify areas prone to gully erosion using four machine learning methods with derived topographic attributes. Eight topographic attributes (elevation, slope aspect, slope degree, catchment area, plan curvature, profile curvature, stream power index, and topographic wetness index) were derived as feature variables controlling gully occurrence from digital elevation models with four different pixel sizes (5.0 m, 12.5 m, 20.0 m, and 30.0 m). A gully inventory map of a small agricultural catchment in Heilongjiang, China, was prepared through a combination of field surveys and satellite imagery. Each topographic attribute dataset was randomly divided into two portions of 70% and 30% for

calibrating and validating four machine learning methods, namely random forest (RF), support vector machines (SVM), artificial neural network (ANN), and generalized linear models (GLM). Accuracy (ACC), area under the receiver operating characteristic curve (AUC), root mean square error (RMSE), and mean absolute error (MAE) were calculated to assess the performance of the four machine learning methods in predicting spatial distribution of gully erosion susceptibility (GES). The results suggested that the selected topographic attributes were capable of predicting GES in the study catchment area. A pixel size of 20.0 m was optimal for all four machine learning methods. The RF method described the spatial relationship between the feature variables and gully occurrence with the greatest accuracy, as it returned the highest values of ACC (0.917) and AUC (0.905) at a 20.0 m resolution. The RF was also the least sensitive to resolutions, followed by SVM (ACC = 0.781–0.891, AUC = 0.724–0.861) and ANN (ACC = 0.744–0.808, AUC = 0.649–0.847). GLM performed poorly in this study (ACC=0.693–0.757, AUC=0.608–0.703). Based on the spatial distribution of GES determined using the optimal method (RF + pixel size of 20.0 m), 16% of the study area has very high level susceptibility classes, whereas areas with high, moderate, and low levels of susceptibility make up approximately 24%, 30%, and 31% of the study area, respectively.

For details:

https://www.sciencedirect.com/science/article/pii/S2095633922000326?via%3Dihub



Gully erosion susceptibility (GES) levels based on the Generalized Linear Models (GLM) algorithm at resolutions of 5.0 m, 12.5 m, 20.0 m, and 30.0 m

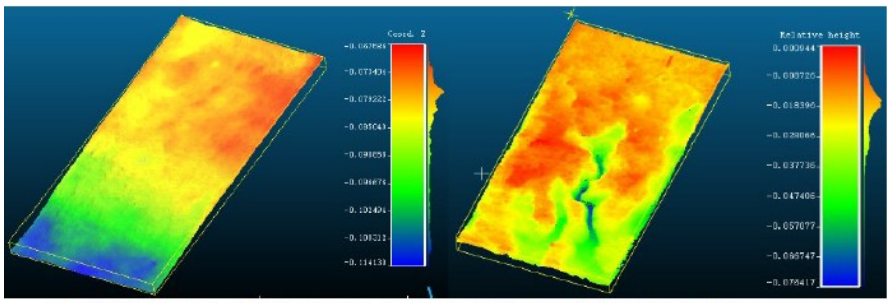
Space-air-ground multi-dimensional integrated monitoring technology for soil erosion dynamic

A technology proposed by Jiangxi Academy of Water Sciences and Engineering, to be able to complete the dynamic soil erosion monitoring.

In the space-air-ground multi-dimensional integrated monitoring technology for soil erosion dynamic, 3D laser scanning, close-range photogrammetry, drone low-altitude remote sensing, and remote sensing inversion model simulation techniques are effectively integrated. It innovatively establishes a dynamic monitoring platform for soil and water loss that integrates different spatial and temporal scales, which enables simulation and estimation of soil erosion processes in different macro and micro contexts. For different monitoring and testing objects, the space-air-ground integrated technology system that combines "3D laser scanning - close-range photogrammetry - drone remote sensing - model simulation" has been developed to achieve dynamic measurement of soil erosion and soil and water conservation benefits with strong timeliness and high accuracy. Related achievements in developing this technology have been awarded the Third Prize of 2021 Dayu Water Conservancy Science and Technology Award and were selected for the 2023 annual list of key recommended advanced practical technologies for water conservancy.

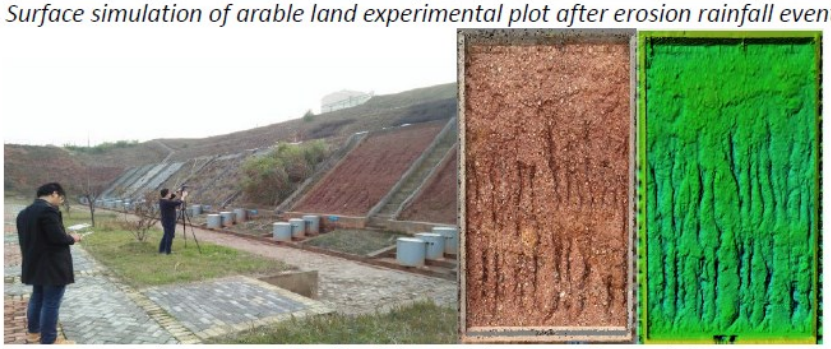
This technological achievement was first applied in 2014 to the construction of the Phase II supporting facilities and Phase III planning projects of Jiangxi Soil and Water Conservation Ecological Science and Technology Park in De'an County, Jiangxi Province. With the continuous deepening of research, it has been expanded to the dynamic monitoring of soil erosion in provincial monitoring areas in Jiangxi Province, the monitoring &acceptance of soil and water conservation measures for key production and construction projects, the collapse management of mountains-rivers-forests-fields-lakes-grasslands ecological protection and restoration projects, as well as key management projects in small watersheds. The promotion and application of this technological achievement has saved a lot of manpower and material resources, and it can improve work efficiency compared with traditional monitoring technology.

For more information, please contact Song Yuejun via well3292@126.com.

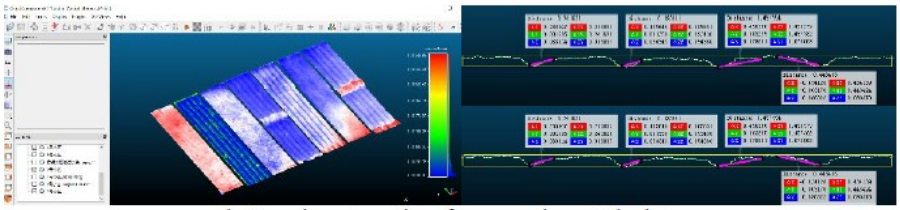


a. 3D simulation of soil erosion processes during different rainfall processes

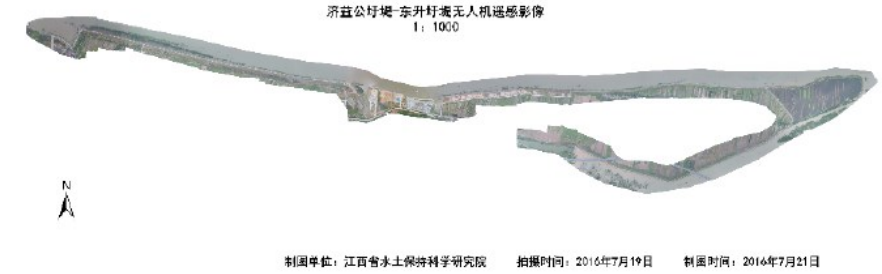
b. Surface simulation of arable land experimental plot after erosion rainfall events



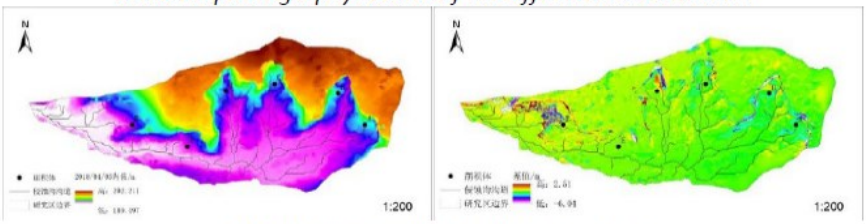
c. Microtopography simulation of slope experimental plot



d. Terrain extraction for experimental plots



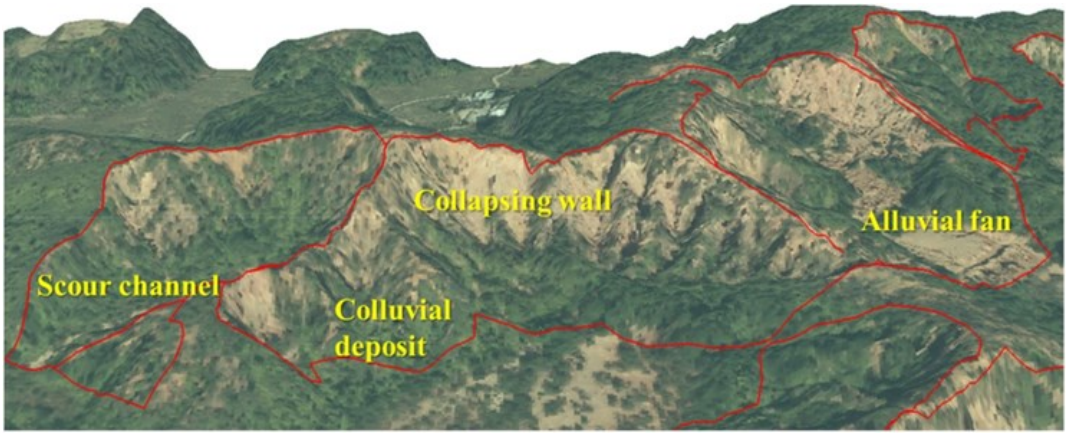
e. Aerial photography results of the affected embankment



f. Monitoring results of collapse erosion

Application Scenarios of the space-air-ground multi-dimensional integrated monitoring technology for soil erosion dynamic

Benggang Segmentation via deep exchanging of digital orthophoto map and digital surface model features



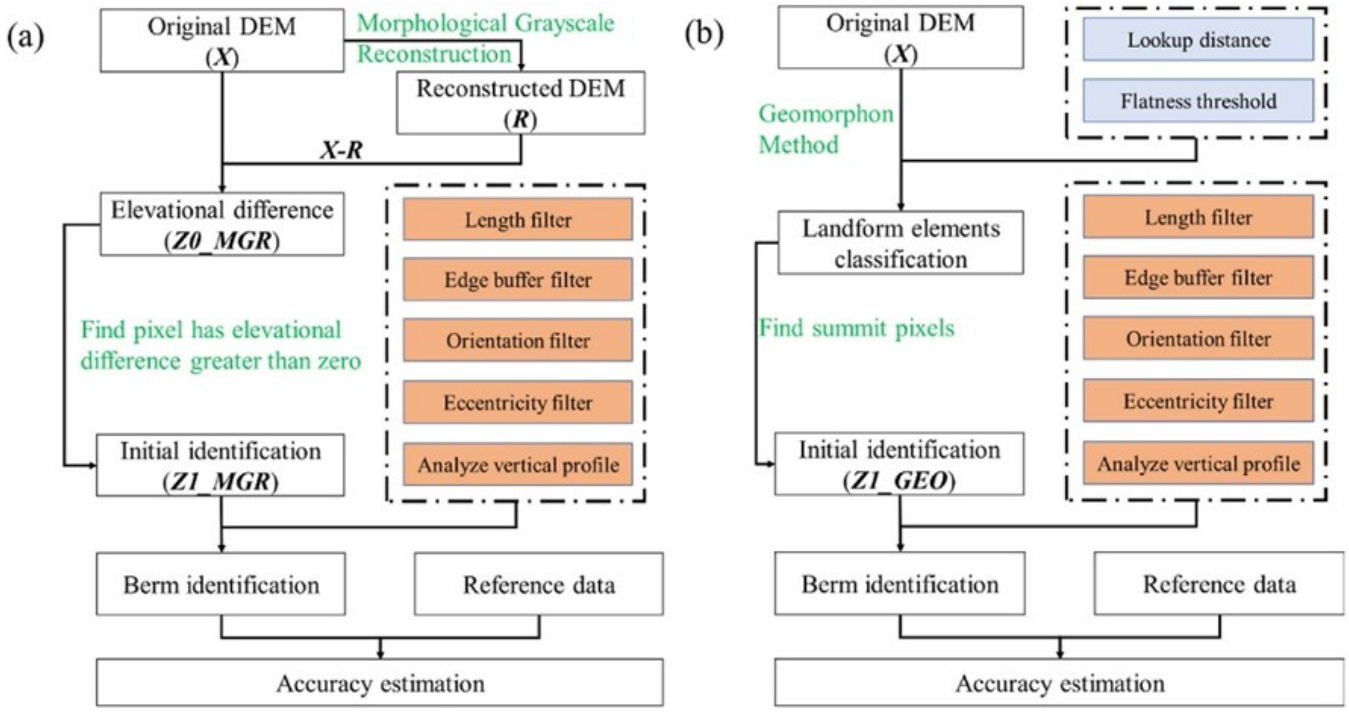
Benggang is a typical fragmented erosional landscape in southern and southeastern China, posing significant risk to the local residents and economic development. Therefore, an efficient and accurate fine-grained segmentation method is crucial for monitoring the Benggang areas. In 2023, Dr. Shen from the Department of Soil and Water Conservation Research at the Changjiang River Scientific Research Institute proposed a deep learning-based automatic segmentation method for Benggang by integrating high-resolution Digital Orthophoto Map (DOM) and Digital Surface Model (DSM) data. The DSM data is used to extract slope maps, aiming to capture primary morphological features. The proposed method consists of a dual-stream convolutional encoder-decoder network in which multiple cascaded convolutional layers and a skip connection scheme are used to extract morphological and visual features of the Benggang areas. The rich discriminative information in the DOM and slope data is fused by a channel exchanging mechanism that dynamically exchanges the most discriminative features from either the DOM or DSM stream according to their importance at the channel level. Evaluation experiments were conducted on a challenging dataset collected from Guangdong Province, China, and the results show that the proposed channel exchanging network based deep fusion method achieves 84.62% IoU in Benggang segmentation, outperforming several existing unimodal or multimodal baselines. The proposed multimodal segmentation method greatly improves the efficiency of large-scale discovery of Benggang, and thus is important for the management and restoration of Benggang in southern and southeastern China, as well as the monitoring of other similar erosional landscapes.

Changes of soil bacterial community, network structure, and carbon, nitrogen and sulfur functional genes under different land use types

Soil microorganisms participate in almost all soil ecological processes and are essential in maintaining ecosystem functions and terrestrial carbon, nitrogen, and sulfur cycles. Soil bacterial communities, networks, biogeochemical cycles, and land use types influence it. However, there are few studies on the changes in these indicators and their influencing factors under different land use types. In 2023, Dr. Huang from the Department of Soil and Water Conservation Research at the Changjiang River Scientific Research Institute took Dongting Lake watershed as a research objective, and high-throughput sequencing technology combined with FAPROTAX were used to analyze the characteristics and influencing factors of soil bacterial community, network structure, and C, N, and S cycle function genes under different land use conditions. Land use types include paddy fields (PF), garden plots (GP), woodland (WL), and sloped arable land (SAL). PLS-PM model and redundancy analysis method were used to study the mechanism of soil bacterial community, network structure, functional genes, and environmental variables. The results showed that the relative abundance of dominant phylum and dominant fungi changed significantly in different land use types. The first three dominant gates in WL had the most considerable abundance and the most extensive diversity index of PF. The symbiotic network of PF has the most effective connectivity and average degree, the minor network diameter, the most complex network structure, and fierce competition among species within the same ecological niche. The results of functional genes showed that different land use types significantly changed the abundance of soil C, N, and S cycle functional genes, and soil bacteria predicted the highest abundance of functional genes in GP. C, N, and S circulating function genes were significantly correlated with pH, soil nutrients, and soil texture ($P < 0.05$). PLS-PM model and redundancy analysis showed that soil pH was the main factor affecting the bacterial community, network structure, and functional genes, followed by soil nutrients.

Semi-automated detection of rangeland runoff and erosion control berms using high-resolution topography data

An inventory of topographic modifications is essential to addressing their impacts on hydrological and morphological processes in human-altered watersheds. However, such inventories are generally lacking. In 2023, Dr. Li from the Department of Soil and Water Conservation Research at the Changjiang River Scientific Research Institute presented two workflows for semi-automatic detection of linear earthen runoff and erosion control berms in rangelands using high-resolution topographic data. .



The proposed workflows that one is based on morphological grayscale reconstruction method (a) and that the other one is based on the Geomorphon method (b).

The workflows consist of initial object identification by applying either morphological gray-scale reconstruction (MGR) or the Geomorphon (GEO) method, followed by identification refinements through filters based on objects' horizontal and vertical information. Three sites were selected within the Altar Valley, Arizona, in the southwestern United States. One site was used for developing workflows and optimizing filter thresholds, and the other two sites were used to validate workflows. The results showed that: 1) The MGR-based workflow methodology could produce final precision and detection rates of up to 92% and 75%, respectively, and take less than 5 s for a 10.1 km2 site; 2) The workflow based on the MGR method yielded greater identification accuracy than did the GEO workflow; 3) Object length, orientation, and eccentricity were important characteristics for identifying earthen berms, and are sensitive to general channel flow direction and berm shape; 4) Manual interrogation of topographic data and imagery can significantly improve identification precision rates. The proposed workflows will be useful for developing inventories of runoff and erosion control structures in support of sustainable rangeland management.

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（Names are arranged in alphabetical order）

WASWAC

The Secretariat of WASWAC
No. 20 Chegongzhuang Road West
Beijing 100048 P.R.China
www.waswac.org.cn
Tel: +86 10 6878 6579
Fax: +86 10 6841 1174
Email: waswac@foxmail.com