

Sessions in LASOSU2021

1. Keynote Sessions

No.	Title	Convener	Co-conveners
KS01	Soil erosion and its control in the countries along the belt and road	Xiaoying Liu	Rosa Maria Poch Claret (Spain), Rui Li, Pengfei Du
KS02	Metacoupling: exploring soil conservation and sustainable development	Xiangzhou Xu	Tingwu Lei, Jing Sun
KS03	Soil erosion processes and mechanism	Guanghui Zhang	Xinxiao Yu, Bofu Yu (Australia)
KS04	Remote sensing and big data in land degradation analysis	Paolo Tarolli (Italy)	Jean Poesen (Belgium), Wei Wei, Guobin Liu, Giancarlo Dalla Fontana (Italy)
KS05	Smart monitoring information system for soil and water conservation	Wenlong Wang	Chi-hua Huang (USA), Xingyi Zhang, Wenzhao Guo
KS06	Decision-making information system for soil and water conservation	Zhijia Shi	Chongfa Cai
KS07	Sustainable land management: practice and its suitability	Hao Feng	Fei Wang, Rui Li, Jos éLuis Rubio (Spain)
KS08	Climate change, land degradation, combatting strategies	Fenli Zheng	Miodrag Zlatic (Serbia), Glenn Wilson (USA)
KS09	Watershed sediment dynamics in changing environment and for ecological sustainability	Xudong Fu	Vincenzo D'Agostino (Italy), Zhanbin Li, Qihua Ran

* Note: The keynote sessions are listed in the order by the related topics of LASOSU2021 in the first circular.

*Description

KS01 Soil erosion and its control in the countries along the Belt and Road

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Rui Li, Institute of Soil and Water Conservation, CAS & MWR, lirui@ms.iswc.ac.cn

Pengfei Du, China Institute of Water Resources and Hydropower Research, waswac@foxmail.com

Keywords: The Belt and Road, soil erosion, ecological problems, erosion types, erosion intensity

KS02 Metacoupling: exploring soil conservation and sustainable development

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<http://faculty.dlut.edu.cn/xuxiangzhou/en/index.htm>

Tingwu Lei, China Agricultural University, leitingwu@cau.edu.cn,
http://water.cau.edu.cn/art/2011/11/11/art_2124_127941.html

Jing Sun, Institute of Agricultural Resources and Regional Planning, CAAS, sunjing@caas.cn, <http://www.iarrp.cn/yjsjy/dsjs/bssds/216987.htm>

Keywords: Soil conservation, watershed regulation, integration and sustainability, effects, metacoupling

KS03 Soil erosion processes and mechanism

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<https://geot.bnu.edu.cn/Public/htm/news/5/323.html>

Xinxiao Yu, Beijing Forestry University, yuxinxiao@bjfu.edu.cn,
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Keywords: Hydrological processes, hydraulics of overland flow, erosion processes, modelling

KS04 Remote sensing and big data in land degradation analysis

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Guobin Liu, Institute of Soil and Water Conservation, Northwest A&F University, gblu@ms.iswc.ac.cn,
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Keywords: Remote sensing, big data, GIS, land degradation, sustainability

KS05 Smart monitoring information system for soil and water conservation

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http://www.iswc.cas.cn/sourcedb_iswc_cas/zw/zjrc/fjy/202012/t20201215_5821269.html

Keywords: Monitoring, sediment, gully erosion, unmanned aerial vehicles, automation

KS06 Decision-making information system for soil and water conservation

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Chongfa Cai, Huazhong Agricultural University, cfcai@mail.hzau.edu.cn,
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Keywords: Soil and water conservation, decision support system, geography information system, soil erosion, ecological civilization construction.

KS07 Sustainable land management: practice and its suitability

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Keywords: Sustainable land management, land use, practice, suitability assessment

KS08 Climate change, land degradation, combatting strategies

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Keywords: Climate change, soil loss, combatting measures

KS09: Watershed sediment dynamics in changing environment and for
ecological sustainability

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Keywords: Watershed sediment dynamics, environment change, human adaptation,
ecological sustainability

2. Specific Sessions

No.	Convener	Co-convener	Session title
SS01	Altaf Ali Siyal (Pakistan)	Guoqiang Yu	Conservation agriculture as sustainable food production system
SS02	Anette Eltner (Germany)	Mihai Niculita (Romania), Sara Cucchiaro (Italy), Paolo Tarolli (Italy)	Advanced remote sensing techniques in land degradation analysis
SS03	Binghui He	Quanhui Dai Donghong Xiong Zicheng Zheng Xiongyong Chen (USA)	Water and soil loss and agricultural sustainable development in southwest mountains, China
SS04	Demetrio Antonio Zema (Italy)	Manuel Esteban Lucas-Borja (Spain)	Forest ecosystems and soil functionality worldwide: past, present and future impacts, evaluation and research
SS05	Ellen Sandbeck (USA)	Tara VanToai (USA)	Environmental and social advantages to on-site and local vermicomposting of food and agricultural waste
SS06	Enheng Wang	Richard M. Curse (USA), Michael L. Thompson (USA), Haoming Fan	Black soil: sustainable use and management
SS07	Federico Preti (Italy)	Paola Sangalli (Spain), Vittoria Capobianco (Norway)	Soil and water bioengineering (SWB) as nature-based solution for slope and bank erosion control, stabilization and ecological restoration
SS08	Guangju Zhao	Klik Andreas (Austria), Bing Wang, Longshan Zhao	Soil erosion assessment and effects of soil and water conservation measures

SS09	Haoming Fan	Sheng Li (Canada), Haiou Shen, Renming Ma	Black soil degradation and conservation
SS10	Jiaojun Zhu	Zeyong Lei, Jinshi Jian (USA)	Desertification control and ecological restoration
SS11	Liangyi Rao	Mengmeng Gu (USA), Xiaoming Feng, Zhenzhou Shen	Ecological restoration and sustainability
SS12	Manuel Esteban Lucas-Borja (Spain)	Demetrio Antonio Zema (Italy)	Effects of restoration measures against soil erosion in rural areas at watershed level: lessons learned from the past and future needs
SS13	Peiqing Xiao	Liangyi Rao Zhihui Wang Zhishui Liang	Resources development and ecological rehabilitation of ecologically fragile areas
SS15	Peng Li	Yang Yu, Peng Shi, Guillaume Piton (France)	Influences of natural and anthropogenic disturbances on watershed management at water-limited ecosystems
SS16	Ranhang Zhao	Liang Ma, Bing Guo	Application of multiple source data in land degradation
SS17	Tongxin Zhu (USA)	Xiangzhou Xu	Gully erosion: impacts and control
SS18	Vito Ferro (Italy)	Vincenzo Bagarello (Italy)	Monitoring and modelling soil erosion processes at different spatial scales towards a sustainable development
SS19	Wei Wei	—	Dryland eco-hydrology and sustainability
SS20	Xingwu Duan	Donghong Xiong, Bin Zhang, Yifan Dong	Soil erosion and ecological restoration in dry hot valley of southwest China
SS21	Zhongwu Li	Xiaosheng Qin	Soil erosion and elements cycles

* Note: The specific sessions are listed in the alphabetical order by the convener's first name.

* Description

SS01 Conservation agriculture as sustainable food production system

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Description: The world's food production depends on the availability of freshwater resources. Though 20 percent of the world's cropland is irrigated, it contributes about 40% of the total food production. Hence, the increase in food production could potentially come from increases in irrigated agriculture. On the one hand, the demand for food, fodder, and fiber is increasing at an alarming rate. On the other hand, the freshwater resources needed for sustainable agriculture are decreasing tremendously. Thus, for future food and fiber demands, the efficient use of water resources with optimum outputs will be the main objective for sustainable agriculture in arid and semi-arid regions. Therefore, it is sensible to think about conservation and efficient water utilization to get more crop production per unit volume of water. This can be achieved by adopting irrigation water-conservation irrigation methods and technologies. Our presentation will focus on water conservation methods, techniques, and technologies best suited for developing countries for more yield per drop of water.

Keywords: Pitcher, drip, sprinkler, zero tillage, furrow irrigation

SS02 Advanced remote sensing techniques in land degradation analysis

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Paolo Tarolli, University of Padova (Italy), paolo.tarolli@unipd.it,
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Description: In the last two decades, a range of new remote-sensing techniques (e.g., new satellites, airborne and terrestrial laser scanners, structure from motion photogrammetry using drones or handled cameras) has led to a dramatic increase in terrain information, providing new opportunities for a better understanding of Earth surface processes based on geomorphic signatures. The availability of high-resolution digital elevation models (DEMs) allows a rapid derivation of geomorphometric parameters or indices that can provide valuable and precise information about the hydro-geomorphic processes. The purpose of this session is to bring local and regional scale studies where advanced remote sensing techniques are used to analyze land degradation phenomena in support of an effective management for landscapes. Early-stage researchers are strongly encouraged to present their research.

Keywords: Remote sensing, digital terrain analysis, land degradation

SS03 Water and soil loss and agricultural sustainable development in southwest mountains, China

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http://fc.gzu.edu.cn/_t88/2011/0825/c2909a19609/page.htm

Donghong Xiong, Institute of Mountain Hazards and Environment, CAS, dhxiong@imde.ac.cn, http://www.imde.ac.cn/yjsjy/dsjj/200910/t20091009_2541266.html

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Xiongyong Chen, Governors State University (USA), xchen@govst.edu

Description: Soil and water loss is the key problem that restricts the sustainable development of society, economy, and ecology in the Southwest Mountains, China. Its specific consequences are reflected by a variety of aspects, such as declines in purple soil fertility, increases in rocky desertification of karst area, and intensifications in non-point source pollution in the tributaries and backwaters of the Three Gorges Reservoir Area. Many effective measures have been designed to control the water and soil loss on the slope farmland, and agroforestry and ecological circular agriculture are developed to assist sustainable development in this region. In this session, the research findings and experiences on the theories, techniques, management practices for conserving water and soil, and pushing agricultural sustainable development in the Southwest Mountains of China will be shared. We welcome communities (e.g., scientists, engineers, decision-makers) focusing on water and soil conservation and agricultural sustainable development to join us in the expectant LASOSU2021.

Keywords: Soil erosion, nutrient loss, non-point source pollution, agroforestry, sustainable management

SS04 Forest ecosystems and soil functionality worldwide: past, present and future impacts, evaluation and research

Demetrio Antonio Zema, Mediterranean University of Reggio Calabria (Italy), dzema@unirc.it

Manuel Esteban Lucas-Borja, University of Castilla La Mancha (Spain), manuelesteban.lucas@uclm.es

Description: Forest ecosystems provide the basic conditions without which humanity could not survive. There is therefore worldwide interest in quantifying forest ecosystem management practices and their impact on soil properties, loss of soil quality, soil erosion and soil deterioration. This session aims to present different research and expert opinions dealing with the forest management arena including climate change, silviculture felling, afforestation and plantation, soil preparation, road construction, wildfires, etc. and forest soils properties (physical, chemical and microbiological soil properties) in order to preserve soil functionality and properties in Forest ecosystem. Forest management guidelines should consider the effect and impact of all the activities related to forest management on soil properties under the adaptive forest management context. This can only happen if people have the right information, skills, and organizations for understanding and dealing with forest soils and forest management practices.

Keywords: Forest ecosystems, soil functionality, soil properties, forest management

SS05 Environmental and social advantages to on-site and local vermicomposting of food and agricultural waste

Ellen Sandbeck, Laverme's Worms (USA), ellen.sandbeck@gmail.com, <http://lavermesworms.com>

Tara VanToai, a former scientist with the USDA Agricultural Research Service (USA), tara@vantoai.com

Description: Ellen Sandbeck, President of Laverme's Worms, will share insights and information gleaned from more than three decades of raising vermicomposting worms, setting up vermicomposting systems for households, businesses, and institutions, and training a wide variety of people, including schoolchildren, retirees, and prison inmates, on how to set up and run a vermicomposting system.

Topics to be discussed:

- ✧ Is a vermicomposting system right for you? Setting up a large vermicomposting system/facility: finding a suitable location; planning; set-up; worker training; and troubleshooting.
- ✧ Environmental benefits of an onsite vermicomposting system include: greatly reduced volume of waste; reduction or total elimination of transportation costs for hauling waste away; prevent agricultural wastes from leaching contaminants into waterways or groundwater; production of extremely valuable liquid and solid organic fertilizer.
- ✧ Community benefits of an onsite vermicomposting system: producing the highest-quality vermi-fertilizer is low-tech and labor-intensive, so new jobs will be created.
- ✧ Individual benefits of vermicomposting: Tales from a prison: how working with worms can change people's minds for the better.

Keywords: Vermicomposting, waste reduction, fertilizer production

SS06 Black soil: sustainable use and management

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Michael L. Thompson, Iowa State University (USA), mlthomps@iastate.edu, <https://www.agron.iastate.edu/people/michael-thompson>

Haoming Fan, Shenyang Agricultural University, fanhaoming@syau.edu.cn, <https://slxy.syau.edu.cn/info/1029/1361.htm>

Description: Black soils (Mollisols) are typically known as the world's most productive soils. Hence, these soils with relatively high levels of organic matter accumulations are commonly used as farmlands. However, modern crop production approaches (e.g., intensive tillage) coupled with rolling topography and erosion-favored climate has accelerated degradation (e.g., soil compaction, loss of organic matter). Scientific use and management of black soil resources are critical to agricultural sustainability and regional development. This session will include but not limited to the theory, practices and experience on soil management and soil health; mainly focus on the improvement of soil quality (maintain and/or increase soil organic matter) by tillage practices, vegetation practices and engineering practices.

Keywords: Soil management, soil health, conservation tillage, agroforestry

SS07 Soil and water bioengineering (SWB) as nature-based solution for slope and bank erosion control, stabilization and ecological restoration

Federico Preti, University of Florence (Spain), Federico.preti@unifi.it, <https://www.unifi.it/p-doc2-2016-200001-P-3f2a3d31332d2e-0.html>

Paola Sangalli, EFIB President (Spain), sangalli@sangallipaisaje.com, <http://www.efib.org/>

Vittoria Capobianco, NGI (Norway), vittoria.capobianco@ngi.no, <https://www.ngi.no/eng>

Description:

- ✧ Application of soil and water bioengineering techniques for watershed management,
- ✧ Soil stabilization and erosion control using traditional and innovative solutions.
- ✧ Vegetation additional reinforcement along a slope.
- ✧ In situ and Lab experiments for monitoring and modeling of soil and water bioengineering techniques (e.g. live cribwalls, gridwalls, palisades).
- ✧ Time evolution of slope stability conditions.
- ✧ Time evolution of ecological conditions in land reclamation.
- ✧ Durability of wooden parts.
- ✧ Combination of NBS with conventional solutions.
- ✧ Innovative simple original and cheap solutions.
- ✧ Transferability analysis.

Early-stage and from impoverished countries researchers are strongly encouraged to present their research.

Keywords: Biotechnical properties, erosion control, slope and bank stabilization and consolidation, nature-based solutions

SS08 Soil erosion assessment and effects of soil and water conservation measures

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Bing Wang, Institute of Soil and Water Conservation, CAS & MWR, bwang@ms.iswc.ac.cn

Longshan Zhao, Guizhou University, longshanzh@163.com

Description: Soil systems are a key component of the delivery of many ecosystem services, including those that are crucial to food security, climate mitigation, and water and nutrient cycling. However, soil systems are facing erosion threats under climate change and intensified land management. Soil erosion leads to serious issues, including the reduction of soil depth, soil organic matter and nutrients, reduced crop yields, the loss of arable land and biodiversity, and enhancement of terrestrial carbon release. To better understand effects of soil erosion on soil systems, there is an urgent need to identify soil erosion prone area, quantify soil erosion rates and reveal soil erosion mechanisms at different spatial and temporal scales, and assess effects of conservation measures on water and sediment yield and transport processes.

Keywords: Soil erosion, conservation measure, effect

SS09 Black soil degradation and conservation

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Renming Ma, Shenyang Agricultural University, marenming@syau.edu.cn,
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Description: Black soils (Mollisols), which have a mollic epipedon enriched with organic matter, are considered as one of the most fertile soils in the world. At present, due to the natural factors processes and the influence of anthropic activities, black soil degradation has become increasingly serious. In the black region of China, soil degradation has gradually deteriorated the ecological environment, threatening regional development and national food security. The protection of black soil has become a strategic event concerning human development and environmental harmony. Therefore, it is of great urgency to conduct research on black soil protection and carry out practices related to agricultural sustainability in the black soil regions. This session will focus on black soil degradation, management, and conservation practices, to drive the international exchanges and cooperation in the soil conservation areas of “One Belt and One Road”.

Keywords: Black soil, soil erosion, conservation practice

SS10 Desertification control and ecological restoration

Jiaojun Zhu, Institute of Applied Ecology, Chinese Academy of Sciences,
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Zeyong Lei, Liaoning Technical University, leizeyong@lntu.edu.cn

Jinshi Jian, College Park, Maryland (USA), jianjinshi734@163.com

Description: Desertification is one of the key environmental issues worldwide because it makes the global environmental bearing pressure continuously increase, and limits the sustainable development of the global economy. “Desertification control and ecological restoration” is one of the major topics in the field of “Land Degradation, Soil Conservation and Sustainable Development”. We will exchange the ideas on the interaction between the climate change and desertification, share the new research results in desertification control and ecological restoration, and discuss the prospects of desertification control by tree-grass ecosystems. We hope this session contributing to the International Forum on Land Degradation, Soil Conservation and Sustainable Development.

Keywords: Desertification control, climate change, ecological restoration, tree and grass

SS11 Ecological restoration and Sustainability

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Zhenzhou Shen, Yellow River Institute of Hydraulic Research, Yellow River Conservancy Commission, shenzz@139.com

Description: Since the restoration ecology experiment was carried out in the 1930s, ecological restoration and restoration ecology science have developed for more than 80 years, and become an interdisciplinary subject integrating ecology, geography, biology, sociology and economics. However, there are still many problems to be discussed about the concept, connotation, related theories, evaluation indexes, standards and engineering practices of ecological restoration and restoration ecology science. This session attempts to explore the topics about cutting-edge theories, technologies, methods and practical cases in the current international ecological restoration research field, the major scientific problems faced in restoration ecology, and how the ecological restoration discipline can help the sustainable development of human society in the future under the changing environment.

Keywords: Ecological restoration, sustainability

SS12 Effects of restoration measures against soil erosion in rural areas at watershed level: lessons learned from the past and future needs

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Demetrio Antonio Zema, Mediterranean University of Reggio Calabria (Italy), dzema@unirc.it

Description: Soil is the key element in the Earth System for controlling hydrological, biological, erosional and geochemical cycles. Moreover, the soils are the source of food and fiber services and resources for human societies. This key role that soils play makes soil conservation necessary to achieve a sustainable world. Soil erosion is a key threat because agriculture, deforestation, grazing, fire, road construction and mining accelerate soil erosion rates. Soil erosion control can be achieved at the pedon scale and slope scale where the detachment of sediments can be controlled with conservation tillage, catch crops, weeds, mulches or geotextiles, afforestation, check-dams and so on. In order to avoid the incision of channels and high erosion rates on slopes, management strategies must be applied. This session will show examples of successful and unsuccessful management actions to rehabilitate and restore degraded ecosystems. We will pay special attention to the strategies and the techniques. This session proposes an exchange of knowledge, ideas and new techniques and strategies that are used under different climatic conditions. We encourage you to submit papers from your own research experience, review papers, and your experience on research and applied projects in order to establish future guidelines for soil erosion.

Keywords: Restoration measures, new techniques, new strategies, climatic condition

SS13 Resources development and ecological rehabilitation of ecologically fragile areas

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Zhishui Liang, Southeast University, zs_liang@seu.edu.cn

Description: Currently, the study of ecological rehabilitation and sustainable development of land resource in ecologically fragile areas have become a hotspot and bottleneck for soil and water conservation and ecological restoration over the world. It is very hard for effective ecological rehabilitation and sustainable resources management in ecologically fragile areas. The main reasons for this are the lack of field observations, insufficient study of degradation mechanisms, and shortcomings of traditional ecological treatment techniques. Novel discovery of mechanisms and new research about techniques are urgently essential to better understand the process of ecosystem degradation and promote the quality of ecological restoration in the ecologically fragile areas. The session provides a platform for cross-disciplinary science that focuses on Spatio-temporal change of ecological system, drive and feedback mechanisms between degradation and complex erosion induced by multiple factors, assessment of ecological carrying capacity, soil conservation techniques from hillslopes to watershed scale, ecological rehabilitation techniques of land resources development zone, restoration of degenerating vegetation, and management techniques for sustainable ecological and economic development. Any contributions to the understanding of physical mechanisms based on detailed field monitoring, high-quality laboratory works, mathematic models and effectiveness assessment methods over the ecologically fragile areas are welcomed.

Keywords: Ecologically fragile area, vegetation degradation, ecological rehabilitation techniques, resources development and management, benefit evaluation of ecological restoration.

SS15 Influences of natural and anthropogenic disturbances on watershed management at water-limited ecosystems

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Description: Ecological construction such as re-vegetation and terrace on the hillslope, and check dam in the channel change microtopography, land use patterns, as well as hydrological pathway and materials transfer have significant effects on earth surface processes. In the past decades, connectivity has become important in the study of hydrological, erosion and geomorphic processes. The element transport processes including non-point pollution nitrogen or phosphorus, heavy metal and so on will be changed with different connectivities. Considering the high complexity of hydro-geomorphic systems, and the various processes that could affect the efficiency of water and sediment flowing through a watershed, studying the hydrological and sediment connectivity is therefore essential. In this session, we welcome studies focused on soil and water conservation measures and their effects on fragile ecosystems. Any contributions to the understanding of watershed management based on field monitoring, laboratory works, development and application of geo-morphometric indices and models are welcomed. This session emphasizes the value of connectivity in properly addressing sediment and water-related issues, and aims at providing important information on when, where and how managers to control hydrological and geomorphic processes and ultimately achieve sustainable watershed management.

Keywords: Vegetation restoration, watershed management, anthropogenic disturbances

SS16 Application of multiple source data in land degradation

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Description: Land degradation is one of the global environmental problems. With the wide application of remote sensing technology and big data, the research on soil degradation has been greatly promoted. The meeting will focus on the application of remote sensing technology and big data and other new technologies and methods in soil degradation. Topics covered:

- ✧ Theory and practice of Land degradation experiments
- ✧ Measurement technologies and instruments for soil loss
- ✧ Remote sensing monitoring index and detection method of land degradation
- ✧ Application of multispectral remote sensing, microwave remote sensing and hyperspectral remote sensing in land degradation monitoring
- ✧ Research theory and method of land degradation analysis based on big data
- ✧ Fusion researches of remote sensing and monitoring data in land degradation analysis
- ✧ land degradation and its response to global change and human activity
- ✧ Land-use change and its impacts on land degradation
- ✧ The interactions among water wind and freeze—thaw erosion in a typical region

Keywords: Land degradation, remote sensing, big data, application

SS17 Gully erosion: impacts and control

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Description: Gully erosion is one of the important processes in sediment production and land degradation in a wide range of environments over the world. While progress has been made through an increasing number of studies over the last few decades, many topics remain underexplored. Such topics include, but are not limited to, the following: research methodology, gully initiation on different surface conditions, erosion processes and their spatial interactions in gully development, soil erodibility and its dynamic changes within gullies, sediment transport and depositional processes, gully erosion susceptibility mapping, water-sediment connectivity between gully and inter-gully areas, gully erosion control measures. We would like to cordially invite you to attend this session and to share your knowledge and research on those important topics.

Keywords: Gully erosion processes, gully erosion susceptibility mapping, gully erosion control measures

SS18 Monitoring and modelling soil erosion processes at different spatial scales towards a sustainable development

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Description: Soil erosion is a process in which soil particles are first detached from the soil surface and then transported by the erosive agent acting as rainfall, overland flow and channelized flow. Accelerated soil erosion affects both natural and anthropogenic environments and it is responsible for land productivity decrease as a consequence of the removal of soil organic matter and plant nutrients. The negative effects of soil erosion include in-site effects such as degradation of soil structure, loss of organic matter, reduction of cultivable soil depth, nutrient content. Erosion also determines off-site damages due to soil particles entering the water system such as sedimentation into channels, loss of reservoir storage, eutrophication of waterways and contamination due to fertilizer and pesticide chemicals. Accurate and repeatable measurements of erosion processes are required both for understanding and realizing a correct modelling. Experiments provide an opportunity to investigate to what extent the concepts used in models, which are a truly valid description of the erosion processes occurring. The session includes the presentation of experimental sites for measuring soil erosion at different spatial (plot, hillslope, basin) scales, methods and procedures for measuring soil erosion processes, and models developed for predicting soil erosion from plots, small basins, rills and gullies.

Keywords: Soil loss measurements, sediment yield measurements, soil erosion modelling, soil loss tolerance

SS19 Dryland Eco-hydrology and Sustainability

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Description: Drylands occupy over 41% of the total territory and a home of 35% world population across the globe, playing key roles in ecosystem services and human welfare for the land and the people. However, due to severe water restriction and strong human activities in such fragile areas, the relationship between water and diverse ecosystems always faces uncertain challenges, which greatly threatens the security and sustainability of human-nature system. In this session, we will try to focus on these arid and semiarid ecosystems around the world, discussing how the eco-hydrology basic rules and methods in helping to enhance a deep understanding of water and ecosystem relations under the changing environments, and finally benefit the ecological protection and restoration in practice. Thus, topics regarding ecosystem restoration, land degradation neutrality, large-scale carbon-water evaluation as well as ecological sustainability in different water-limited regions are all welcomed.

Keywords: Water-restricted regions, ecosystem, water, land degradation

SS20 Soil erosion and ecological restoration in dry hot valley of Southwest China

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Description: The Dry-hot Valleys are ecologically fragile zones in southwest China, which are distributed along important large rivers such as the Jinsha river, Yuanjiang river, and Nujiang river. The intensive rainfall, low vegetation cover, and the cultivation on steep slopes lead to severe soil erosion and land degradation in dry hot valleys. On the other hand, the climate type with abundant light and heat resources is rare in China, which made these regions have a high potential to develop tropical agriculture. Therefore, how to develop an agricultural economy and avoid the high rate of soil loss became the key environmental issue in dry hot valleys. In this session, we want to discuss the following issues in the dry hot valley regions: (1) the soil erosion processes and their environmental effect, (2) the measures and techniques of soil conservation and vegetation restoration, (3) the key limiting factors for ecological restoration, and (4) the balances between the fragile ecology and tropical agriculture development.

Keywords: Soil erosion, land degradation, vegetation recovery, tropical agriculture, dry hot valley

SS21 Soil erosion and elements cycles

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Description: As a worldwide physical geographic phenomenon, soil erosion is an essential driving force of soil elements (including but not limited to carbon, nitrogen and trace elements) dynamics. The migration and transformation of these elements have a severe impact on the global environment. For example, the mineralization of carbon induced by soil erosion could have significant effects on the levels of atmospheric C concentration; the migration and transformation of nitrogen and heavy metals could have led to serious soil and water pollution. In recent years, the influence of soil erosion on element cycles has attracted increasing attention. However, the relationships between them and the underlying mechanisms are still poorly understood. Here, we propose a session about “soil erosion and elements cycles”, and we hope that this session can attract a high quality of communication and collision of ideas on the current topic. Any abstracts related to the topic are anticipated

Keywords: Soil erosion, transportation, conversion, carbon, nitrogen, heavy metal