United Nations Educational, Scientific and Cultural Organization

Intergovernmental Hydrological Programme

UNESCO Land Subsidence International Initiative

Newsletter of the Unesco Land Subsidence International Initiative

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Iran, opening ceremony UNESCO Chair on Coastal Geo-Hazard Analysis

I am pleased to inform you that the Research Institute for Earth Sciences (RIES) succeeded in hosting a UNESCO Chair on Coastal Geo-Hazard Analysis. An honour which bestowed on valuable international supportive recommendations after two years of evaluation process at UNESCO. A subject that undoubtedly requires important and hard work on an international scale.

Therefore, we would like to invite you to join us in the opening ceremony, which will be an opportunity to exchange point of views.

Opening Ceremony will be held virtually as well as physically at ***Wednesday of February 23 2022*** at the deck of Persian Gulf Research Wessel at 13h00 (in Iran Time because +5.5 to -3.5 hours of time tolerance between Japan and UK with respect to Tehran respectively) by attending all the members of the Scientific Council from Japan, China, Russia, Armenia, Germany, Switzerland, France, UK and Iran.

It is expected that officials from UNESCO Paris and the National Commission for UNESCO in Iran, as well as university presidents, government officials and Iranian parliamentarians will be among the guests at the event.

The possibility of your presence for me and my colleagues in the UNESCO chair will be very promising and valuable.

Would be appreciated to confirm receipt of the message and your presence.

New Literature

General

Lee, K. et al., Enhancing Informed Decisions for Coastal Groundwater Sustainability: A

Network Analysis of Water-Related Indicator Results from 122 Cities.

Water 2022, 14, 262. https://doi.org/10.3390/w14020262

https://www.mdpi.com/2073-4441/14/2/262/pdf

Cyprus, Limassol

Fotiou, K.; Kakoullis, D.; Pekri, M.; Melillos, G.; Brcic, R.; Eineder, M.; Hadjimitsis, D.G.; Danezis, C. Space-based Deformation Monitoring of Coastal Urban Areas: The Case of Limassol's Coastal Front. Preprints 2022, 2022010417 (doi: 10.20944/preprints202201.0417.v1).

https://www.preprints.org/manuscript/202201.0417/v1

India, Delhi

Garg, S., Motagh, M., Indu, J. et al. Tracking hidden crisis in India's capital from space: implications of unsustainable groundwater use. Sci Rep 12, 651 (2022). https://doi.org/10.1038/s41598-021-04193-9

Indonesia, Pekalongan

Zainuri M, Helmi M, Novita M G A, Pancasakti Kusumaningrum H, Koch M. An Improve Performance of Geospatial Model to Access the Tidal Flood Impact on Land Use by Evaluating Sea Level Rise and Land Subsidence Parameters. Journal of Ecological Engineering. 2022;23(2):1-11. doi:10.12911/22998993/144785. http://www.jeeng.net/An-Improve-Performance-of-Geospatial-Model-to-Access-the-Tidal-Flood-Impact-on-Land,144785,0,2.html

Indonesia, Semarang

Lo, W.; Purnomo, S.N.; Dewanto, B.G.; Sarah, D.; Sumiyanto. Integration of Numerical Models and InSAR Techniques to Assess Land Subsidence Due to Excessive Groundwater Abstraction in the Coastal and Lowland Regions of Semarang City. Water 2022, 14, 201. https://doi.org/10.3390/w14020201

https://www.mdpi.com/2073-4441/14/2/201

Iran

Safdari, Z.; Nahavandchi, H.; Joodaki, G. Estimation of Groundwater Depletion in Iran's Catchments Using Well Data. Water 2022, 14, 131. https://doi.org/10.3390/w14010131

https://www.mdpi.com/2073-4441/14/1/131/htm

Iran,

Sekkeravani, M.A., Bazrafshan, O., Pourghasemi, H.R. et al. Spatial modeling of land subsidence using machine learning models and statistical methods. Environ Sci Pollut Res (2022). https://doi.org/10.1007/s11356-021-18037-6

Iran, Tehran-Plain

Zeinab Azarakhsh, Mohsen Azadbakht, Aliakbar Matkan,

Estimation, modeling, and prediction of land subsidence using Sentinel-1 time series in Tehran-Shahriar plain: A machine learning-based investigation,

Remote Sensing Applications: Society and Environment, 2022, 100691, ISSN 2352-9385,

https://doi.org/10.1016/j.rsase.2021.100691.

(https://www.sciencedirect.com/science/article/pii/S2352938521002275)

Iran, Yazd Plain

Amin, P., Ghalibaf, M. A., & Hosseini, M. (2022). Modeling for temporal land subsidence forecasting using field surveying with complementary drone imagery testing in Yazd Plain, Iran. Environmental monitoring and assessment, 194(1), 1-14.

https://www.researchgate.net/publication/357163923_Modeling_for_temporal_land_subsidence_forecasting_using_field_surveying_with_complementary_drone_imagery_testing_in_Yazd_Plain_Iran

Mexico, Mexico City

Fernández-Torres, E.A., Cabral-Cano, E., Novelo-Casanova, D.A. et al. Risk assessment of land subsidence and associated faulting in Mexico City using InSAR. Nat Hazards (2022). https://doi.org/10.1007/s11069-021-05171-0

And also:

Enrique Antonio Fernandez-Torres et al., Risk assessment of land subsidence and associated faulting in Mexico City using InSAR.

https://www.researchgate.net/publication/358210943_Risk_assessment_of_land_subsidence_and_associated_faulting_in_Mexico_City_using_InSAR

PR China, Choshui River Basin

Huang, Y.-H.; Lai, Y.-J.; Wu, J.-H. A System Dynamics Approach to Modeling Groundwater Dynamics: Case Study of the Choshui River Basin. Sustainability 2022, 14, 1371. https://doi.org/10.3390/su14031371

https://www.mdpi.com/2071-1050/14/3/1371

PR China, Cultural Heritage

Yuqi Li et al.,

The potential impact of rising sea levels on China's coastal cultural heritage: a GIS risk assessment

Published online by Cambridge University Press: 24 January 2022

PR China, Tianjin

Yu Liang et al., Estimation of land subsidence potential via distributed fiber optic sensing

January 2022Engineering Geology DOI: 10.1016/j.enggeo.2022.106540

Project: Land subsidence monitoring using distributed fiber optics sesing (DFOS) techniques

https://www.researchgate.net/publication/358085251_Estimation_of_land_subsidence_potential_via_distributed_fiber_optic_sensing/figures?lo=1&utm_source=google&utm_medium=organic

Taiwan

Fiaz Hussain, Water table response to rainfall and groundwater simulation using physics-based numerical model: WASH123D, February 2022Journal of Hydrology: Regional Studies 39(6):100988 DOI: 10.1016/j.ejrh.2022.100988

https://www.researchgate.net/publication/357670236_Water_table_response_to_rainfall_and_groundwater_simulation_using_physics-based_numerical_model_WASH123D

Dong-Sin Shih et al.,

Combined Numerical Simulation and Groundwater Depletion Sensitivity Analysis for Dynamic Pumping Management

https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29WR.1943-5452.0001530

USA, California

Jiancun Shi et al., Monitoring and analysing long-term vertical time-series deformation due to oil and gas extraction using multi-track SAR dataset: A study on lost hills oilfield,International Journal of Applied Earth Observation and Geoinformation, Volume 107, 2022, 102679, ISSN 0303-2434,

https://doi.org/10.1016/j.jag.2022.102679.

(https://www.sciencedirect.com/science/article/pii/S0303243422000058)

USA, Houston

Shunyao Wang, Guo Zhang, Zhenwei Chen, Hao Cui, Yuzhi Zheng, Zixing Xu & Qihan Li (2022) Surface deformation extraction from small baseline subset synthetic aperture radar interferometry (SBAS-InSAR) using coherence-optimized baseline combinations, GIScience & Remote Sensing, 59:1, 295-309, DOI: 10.1080/15481603.2022.2026639

https://www.tandfonline.com/doi/full/10.1080/15481603.2022.2026639

USA, Texas

Haley, M.; Ahmed, M.; Gebremichael, E.; Murgulet, D.; Starek, M. Land Subsidence in the Texas Coastal Bend: Locations, Rates, Triggers, and Consequences. Remote Sens. 2022, 14, 192. https://doi.org/10.3390/rs14010192

USA, Texas, Rookery Island

ROOKERY ISLAND RESILIENCY DESIGN GUIDE

https://www.glo.texas.gov/coast/coastal-management/forms/files/design-guides/final_rookeryisland_designguide.pdf

USA, Virginia

Roethlisberger, N.D., Analysis of a Multi-Aquifer System in the Southern Coastal Plain of Virginia by Trial and Error Model Calibration to Observed Land Subsidence.

https://vtechworks.lib.vt.edu/handle/10919/107513

Vietnam

Dunn, F.E., Minderhoud, P.S.J. Sedimentation strategies provide effective but limited mitigation of relative sea-level rise in the Mekong delta. Commun Earth Environ 3, 2 (2022). https://doi.org/10.1038/s43247-021-00331-3

Mining

France, Vauvert mine

Ho Tong Minh, D.; Ngo,Y.-N. Compressed SAR Interferometry in the Big Data Era. Remote Sens. 2022, 14, 390. https://doi.org/10.3390/rs14020390

https://www.mdpi.com/2072-4292/14/2/390/pdf

Poland, Pila Mlyn

Rurek, M. et al., Environmental and Socio-Economic Effects of Underground Brown Coal Mining in

Piła Młyn (Poland). Land 2022, 11,219. https://doi.org/10.3390/land11020219

https://www.mdpi.com/2073-445X/11/2/219/pdf

PR China

Junliang Zheng et al.,

An Accurate Digital Subsidence Model for Deformation Detection of Coal Mining Areas Using a UAV-Based LiDAR

January 2022Remote Sensing 14(2):421 Follow journal

DOI: 10.3390/rs14020421

https://www.researchgate.net/publication/357905862_An_Accurate_Digital_Subsidence_Model_for_Deformation_Detection_of_Coal_Mining_Areas_Using_a_UAV-Based_LiDAR

Xiaopeng Liu, Liangji Xu, "Soil-Building Interaction under Surface Horizontal Strain Induced by Underground Mining", Advances in Civil Engineering, vol. 2022, Article ID 2425936, 12 pages, 2022. https://doi.org/10.1155/2022/2425936

PR China, Loess Plateau

Mi, J.; Yang, Y.; Hou, H.; Zhang, S.; Ding, Z.; Hua, Y. Impacts of Ground Fissures on Soil Properties in an Underground Mining Area on the Loess Plateau, China. Land 2022, 11, 162. https://doi.org/10.3390/land11020162

https://www.mdpi.com/2073-445X/11/2/162/htm

and:

Zhang, H., Zeng, R., Zhang, Y., Zhao, S., Meng, X., Li, Y., ... & Yang, Y. (2022). Subsidence monitoring and influencing factor analysis of mountain excavation and valley infilling on the Chinese Loess Plateau: A case study of Yan'an New District. Engineering Geology, 297, 106482.

https://www.sciencedirect.com/science/article/abs/pii/S0013795221004932?dgcid=rss_sd_all

PR China, Sanshandao Gold Mine

Liu, J., Ma, F., Li, G., Guo, J., Wan, Y., & Song, Y. (2022). Evolution Assessment of Mining Subsidence Characteristics Using SBAS and PS Interferometry in Sanshandao Gold Mine, China. Remote Sensing, 14(2), 290.

https://www.mdpi.com/2072-4292/14/2/290

PR China, Wugou coal mine

Xiaojun Zhu, Zhengyuan Ning, Hua Cheng, Pengfei Zhang, Ru Sun, Xiaoyu Yang, Hui Liu,

A novel calculation method of subsidence waterlogging spatial information based on remote sensing techniques and surface subsidence prediction, Journal of Cleaner Production, 2022, 130366,

ISSN 0959-6526,https://doi.org/10.1016/j.jclepro.2022.130366.

(https://www.sciencedirect.com/science/article/pii/S0959652622000129)

Wang, R. et al., A Novel Method of Monitoring Surface Subsidence Law Based on Probability Integral Model Combined with Active and Passive Remote Sensing Data. Remote Sens.

2022, 14, 299. https://doi.org/10.3390/rs14020299

https://www.mdpi.com/2072-4292/14/2/299/pdf

Modelling

Alireza Arabameri et al.,

Application of novel ensemble models and k-fold CV approaches for Land subsidence susceptibility modelling

January 2022 Stochastic Environmental Research and Risk Assessment 36(6):1-23

DOI: 10.1007/s00477-021-02036-7

https://www.researchgate.net/publication/351936790_Application_of_novel_ensemble_models_and_k-fold_CV_approaches_for_Land_subsidence_susceptibility_modelling/figures?lo=1

Monitoring

United Nations, Water Portal

How has space revolutionised subsidence?

http://space4water.org/news/how-has-space-revolutionised-subsidence

United States, California

Vertical Land Motion along California coast (here you can download a dataset)

https://figshare.com/articles/dataset/Vertical_Land_Motion_along_California_coast/17711000

Acoustic sensing

Using Sound and Vibration Signals to Understand the Subsurface

A new book explores Distributed Acoustic Sensing, a technology with a range of applications across geophysics and related fields.

https://eos.org/editors-vox/using-sound-and-vibration-signals-to-understand-the-subsurface

From the Press

General

This article refers to our worldmap!

Land Subsidence Threatens 21% of Major Cities Worldwide

https://www.fluencecorp.com/land-subsidence-threatens-real-estate-sector/

India, Bengal

No Rehab in Sight, Thousands Live in Areas Made Vulnerable by Mining in Bengal's Raniganj Coalfields

https://www.newsclick.in/no-rehab-sight-thousands-live-areas-made-vulnerable-mining-bengals-raniganj-coalfields

India, Delhi

Excessive groundwater extraction causing parts of Delhi-NCR to sink: Study

https://www.hindustantimes.com/cities/delhi-news/excessive-groundwater-extraction-causing-parts-of-delhi-ncr-to-sink-study-101642441000326.html

Delhi airport and surrounding area at high risk of land subsidence

https://zeenews.india.com/india/delhi-airport-and-surrounding-area-at-high-risk-of-land-subsidence-heres-reason-why-2429233.html

Indonesia, Jakarta

Indonesia makes plans to save capital from sinking

https://smartwatermagazine.com/news/smart-water-magazine/indonesia-makes-plans-save-capital-sinking

Pipeline to saving Indonesia's sinking capital

https://klse.i3investor.com/blogs/kianweiaritcles/2022-01-06-story-h1596584028-Pipeline_to_saving_Indonesia_s_sinking_capital.jsp

Indonesian parliament passes law to relocate capital to Nusantara

http://www.news.cn/asiapacific/20220119/88ef730fdf48483f9f1f19b6ce0e632f/c.html

USA, Virginia

Slowing Subsidence in Southeastern Virginia with Aquifer Recharge

by Michael Grande

https://medium.com/@GSPIAe_eBlog/slowing-subsidence-in-southeastern-virginia-with-aquifer-recharge-55951a8e098d

Vietnam, Mekong Delta

Solutions sought to land subsidence, saltwater intrusion in Mekong Delta region

Vietnamese and Dutch experts gave recommendations on measures to respond to land subsidence and saltwater intrusion in the Mekong Delta region during a scientific conference on January 12.

https://en.vietnamplus.vn/solutions-sought-to-land-subsidence-saltwater-intrusion-in-mekong-delta-region/220641.vnp

Low water level of the Mekong River for 3 consecutive years, a big challenge for the Mekong Delta

https://www.newsnpr.org/low-water-level-of-the-mekong-river-for-3-consecutive-years-a-big-challenge-for-the-mekong-delta/