United Nations Educational, Scientific and Cultural Organization

Intergovernmental Hydrological Programme

UNESCO Land Subsidence International Initiative

Newsletter of the Unesco Land Subsidence International Initiative

https://assamtribune.com/groundwater-pollution-and-depletion/

Vol.10 January 2021

Webinar

A free webinar on Land Subsidence Mapping with Sentinel-1 (about 50 minutes) on youtube.

https://www.un-spider.org/news-and-events/events/land-subsidence-mapping-sentinel-1

New Literature

Modelling

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https://www.mdpi.com/2076-3417/11/2/609/pdf

Modelling

From: Arabian Journal for Science and Engineering: Chao Jia

Spatiotemporal Evolution Characteristics and Transfer Law of Land Subsidence in Sand-Clay Interbed Caused by Exploiting the Groundwater.

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Monitoring

Lei Gao et al.,

3D Visualization Monitoring and Early Warning of Surface Deformation in Subsidence Area Based on GIS

DOI: 10.1155/2021/6675241

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Modelling

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Monitoring

Tangdamrongsub, N.; Šprlák, M. The Assessment of Hydrologic- and Flood-Induced Land Deformation in Data-Sparse Regions Using GRACE/GRACE-FO Data Assimilation. Remote Sens. 2021, 13, 235. https://doi.org/10.3390/ rs13020235

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Egypt, Nile Delta

AbouAly, N., Hussien, M., Rabah, M. et al. Land deformation monitoring by GNSS in the Nile Delta and the measurements analysis. Arab J Geosci 14, 150 (2021). https://doi.org/10.1007/s12517-021-06497-6

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India

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https://www.tandfonline.com/doi/abs/10.1080/1064119X.2020.1870181?journalCode=umgt20

Indonesia, Jakarta

IOP Conference Series:

Donny Victorianus *et al* 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **1007** 012018

Floating Neighbourhood to anticipate Jakarta Flooding.

https://iopscience.iop.org/article/10.1088/1757-899X/1007/1/012018

Iran, Semnan Plain

Majid Mohammady et al., Spatial modeling of suspectibility to subsidence using machine learning techniques.

https://www.researchgate.net/publication/348429460_Spatial_modeling_of_susceptibility_to_subsidence_using_machine_learning_techniques

Iran, Tehran

Fereshteh Tarighat et al., Monitoring of Power Towers' Movement Using Persistent Scatterer SAR Interferometry in South West of Tehran

https://www.mdpi.com/2072-4292/13/3/407

Italy, Emilia Romagna

Giambastiani, B.M.S.; Kidanemariam, A.; Dagnew, A.; Antonellini, M. Evolution of Salinity and Water Table Level of the Phreatic Coastal Aquifer of the Emilia Romagna Region (Italy). Water 2021, 13, 372. https://doi.org/10.3390/w13030372

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Italy, North Adriatic Coast

Mattia Amadi

Mattia Amadi et al., Cost-benefit analysis of coastal flood defence measures in the North Adriatic Sea.

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Japan, Mapping

Morishita, Y. Nationwide urban ground deformation monitoring in Japan using Sentinel-1 LiCSAR products and LiCSBAS. Prog Earth Planet Sci 8, 6 (2021). https://doi.org/10.1186/s40645-020-00402-7

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Japan, Saporro

Taeyoo Na, Youhei Kawamura, Seong-seung Kang & Shinji Utsuki (2021) Hazard mapping of ground subsidence in east area of Sapporo using frequency ratio model and GIS, Geomatics, Natural Hazards and Risk, 12:1, 347-362, DOI: 10.1080/19475705.2021.1873198

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Mexico, Aquascalientes Valley

Satellite InSAR survey of structurally-controlled land subsidence due to groundwater exploitation in the Aguascalientes Valley, Mexico

March 2021Remote Sensing of Environment 254:112254

DOI: 10.1016/j.rse.2020.112254

https://www.researchgate.net/publication/348169876_Satellite_InSAR_survey_of_structurally-controlled_land_subsidence_due_to_groundwater_exploitation_in_the_Aguascalientes_Valley_Mexico

Nepal, Kathmandu

Pallav Kumar Shrestha, Narendra Man Shakya, Vishnu Prasad Pandey, Stephen J. Birkinshaw & Sangam Shrestha (2017) Model-based estimation of land subsidence in Kathmandu Valley, Nepal, Geomatics, Natural Hazards and Risk, 8:2, 974-996, DOI: 10.1080/19475705.2017.1289985

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Pakistan, Thatta and Jamshoro Districts

Sultan, M., Javed, F., Mahmood, F. *et al.* Assessment of subsidence phenomena for the Thatta, Jamshoro Districts, Southern Pakistan. *Arab J Geosci* **13,** 1295 (2020). https://doi.org/10.1007/s12517-020-06287-6

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Zhou, Z., Wang, C., Bi, J. et al. Simulation of Underground Freshwater Exploitation and Analysis of Environmental Impact in Hangzhou Bay New Area, China**.**

Nat Resour Res (2021). ***https://doi.org/10.1007/s11053-020-09808-y***

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Qiao Shi-fan, Tan Jun-kun, Zhang Yong-gang, Wan Li-jun, Zhang Ming-fei, Tang Jun, He Qing, "Settlement Prediction of Foundation Pit Excavation Based on the GWO-ELM Model considering Different States of Influence", Advances in Civil Engineering, vol. 2021, Article ID 8896210, 11 pages, 2021. https://doi.org/10.1155/2021/8896210

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PR China, Jiangsu Province

Zhang, Y.; Wu, H.; Li, M.; Kang, Y.; Lu, Z. Investigating Ground Subsidence and the Causes Over the Whole Jiangsu Province, China Using Sentinel-1 SAR Data. Remote Sens. 2021, 13, 179. https://doi.org/ 10.3390/rs13020179

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PR China, Shanghai

Ming-Guang Li et al.,

Effects of groundwater exploitation and recharge on land subsidence and infrastructure settlement patterns in Shanghai,

Engineering Geology,2021,105995,ISSN 0013-7952,

https://doi.org/10.1016/j.enggeo.2021.105995.

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PR China, Shenzen, Hong Kong

Tanxin Feng et al., Satellite-Based Monitoring of Annual Coastal Reclamation in Shenzhen and Hong Kong since the 21st Century: A Comparative Study

J. Mar. Sci. Eng. **2021**, *9*(1), 48; https://doi.org/10.3390/jmse9010048 (registering DOI)

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PR China, Tianjin

Wei Tang et al., Spatial variability of relative sea-level rise in Tianjin, China: Insight from InSAR, GPS, and tide-gauge observations

January 2021IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing PP(99):1-1 Follow journal

DOI: 10.1109/JSTARS.2021.3054395

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PR China, Weihe Basin

Zhu, J., Qiao, J., Wang, F. *et al.* Development characteristics and formation analysis of the Liangjia Village earth fissure in the Weihe Basin, China. *Front. Earth Sci.* (2021). https://doi.org/10.1007/s11707-020-0840-2

Turkey, Karapinar Region

Osman Orhan et al., Land Subsidence and Its Relations with Sinkhole Activity in Karapınar Region, Turkey: A Multi-Sensor InSAR Time Series Study

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USA

Joshi, N. et al., Analyzing the Effects of Short-Term Persistence and Shift in Sea Level Records along the US Coast.

Hydrology 2021, 8, 17. https://doi.org/10.3390/hydrology8010017

USA, Lake Mead

Mehdi Darvishi et al., Multi-Sensor InSAR Assessment of Ground Deformations around Lake Mead and Its Relation to Water Level Changes

January 2021Remote Sensing 13(3):406 Follow journal

DOI: 10.3390/rs13030406

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USA, Nevada, Brady Field

Cavur, M. et al., Displacement Analysis of Geothermal Field Based on PSInSAR

And SOM Clustering Algorithms: A Case Study of Brady Field, Nevada—USA. Remote Sens. 2021,

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Vietnam, Mekong Delta

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https://www.tandfonline.com/doi/abs/10.1080/10106049.2020.1869329?journalCode=tgei20

Kim de Wit et al., Identifying Causes of Urban Differential Subsidence in the Vietnamese Mekong Delta by Combining InSAR and Field Observations.

Remote Sens. ***2021***, 13*(2), 189; https://doi.org/10.3390/rs13020189 (registering DOI)*

https://www.mdpi.com/2072-4292/13/2/189

Spain, Alto Guadalentin

J.A. Fernández-Merodo et al., (with Gerardo as co-author)

Modeling historical subsidence due to groundwater withdrawal in the Alto Guadalentín aquifer-system (Spain),

Engineering Geology,2021,105998,

ISSN 0013-7952,

https://doi.org/10.1016/j.enggeo.2021.105998.

(http://www.sciencedirect.com/science/article/pii/S0013795221000090)

Conferences

Indonesia, Jakarta

IOP Conference Series:

Donny Victorianus *et al* 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **1007** 012018

Floating Neighbourhood to anticipate Jakarta Flooding.

https://iopscience.iop.org/article/10.1088/1757-899X/1007/1/012018

Projects

A Project Awarded by Copernicus: The new European Groundmotion Service

The Telespazio and Italian Space Agency joint venture, e-GEOS, has coordinated a successful bid in response to an invitation to tender issued and assigned by the European Environment Agency (EEA). e-GEOS will lead a consortium including, amongst others, the German members GAF and DLR, the Norwegian institute NORCE, the LTK Satellite Geodetic Observatory (SGO, Hungary), the Dutch company PPO.labs and the Italian company TRE ALTAMIRA. The new European Ground Motion Service (EGMS) will enable monitoring of millimeter-range ground motion through time series of satellite based radar observations.

https://www.directionsmag.com/pressrelease/10447

From the Press

Still some references from the publication in Science:

Interesting Engineering:

https://interestingengineering.com/46-million-square-miles-of-land-will-sink-in-by-2040-reveals-new-study

In Sciencemint:

https://sciencemint.com/new-study-reveals-4-6-million-square-miles-of-land-will-sink-in-by-2040/

Hobbs online News:

https://www.hobbsonlinenews.net/global-threat-sinking-land/

The Guardian:

https://www.theguardian.com/world/2020/dec/31/land-subsidence-will-affect-almost-fifth-of-global-population

Smartwater Magazine:

https://smartwatermagazine.com/news/smart-water-magazine/world-map-shows-land-subsidence-due-groundwater-extraction

Mahamedia:

http://mahamediaonline.com/en/life-style/health-tips/sinking-land-will-affect-635m-people-globally--report

Asia Insurance Review:

https://www.asiainsurancereview.com/News/View-NewsLetter-Article/id/75202/type/ARM/Land-subsidence-could-affect-20-of-global-population-by-2040

France24:

https://www.france24.news/en/2021/01/land-subsidence-threatens-one-fifth-of-the-worlds-population.html

Smithsonian Magazine:

https://www.smithsonianmag.com/smart-news/its-official-ground-sinking-180976688/

Voice of Russian Speaking America:

https://www.forumdaily.com/en/k-2040-godu-pod-vodu-mozhet-ujti-chast-sushi-prevyshayushhaya-ploshhad-ssha/

Newsabode.com:

https://newsabode.com/model-predicts-global-threat-9838-2/

Rahnuma Daily (India)

https://www.therahnuma.com/sinking-land-will-affect-635m-people-globally-report/

Triplepundit (USA) heads Land Subsidence Threatens Communities — and the Global Real Estate Sector :

https://www.triplepundit.com/story/2021/land-subsidence-threat/709766

From Brazil: Rio Times online:

https://riotimesonline.com/brazil-news/miscellaneous/study-shows-that-8-of-earths-surface-could-submerge-in-less-than-20-years/

Wired:

https://www.wired.com/story/the-ongoing-collapse-of-the-worlds-aquifers/

and:

The Ongoing Collapse of the World's Aquifers: **"Geology is geology…We can't do anything about that" (Michelle Sneed)** — Wired

https://coyotegulch.blog/2021/01/20/the-ongoing-collapse-of-the-worlds-aquifers-geology-is-geology-we-cant-do-anything-about-that-michelle-sneed-wired/

Website Utrecht University:

https://www.uu.nl/en/news/international-unesco-research-team-to-publish-the-first-global-subsidence-map

Indonesia, Jakarta

A nice movie (4 minutes) to demonstrate the mechanism of land subsidence.

https://www.google.com/search?q=land+subsidence&rlz=1C1GCEA_enNL857NL857&source=lnt&tbs=qdr:d&sa=X&ved=2ahUKEwju8brZn63uAhXCO-wKHd1AByIQpwV6BAgFECU&biw=1680&bih=863

India, Assam

https://assamtribune.com/groundwater-pollution-and-depletion/

India, Kolkata

Kolkata's Salt Lake area sinking 19-20 mm per year: GSI

https://inshorts.com/en/news/kolkatas-salt-lake-area-sinking-1920-mm-per-year-gsi-1571577217361

Indonesia, Jakarta

Last mangrove ecosystem in Jakarta city under threat from land subsidence and climate change

https://www.channelnewsasia.com/news/climatechange/jakarta-mangroves-land-subsidence-pantai-indah-kapuk-indonesia-13999688

PR China, Hongkong

No need to worry about 'sinking' ground around MTR's To Kwa Wan station, Hong Kong government says.

https://www.scmp.com/yp/discover/news/hong-kong/article/3054435/no-need-worry-about-sinking-ground-around-mtrs-kwa-wan

USA, California

California WaterBlog:

California's Sacramento-San Joaquin Delta – a short history of big changes

https://californiawaterblog.com/2021/01/03/californias-sacramento-san-joaquin-delta-a-short-history-of-big-changes/?shared=email&msg=fail

Vietnam

https://www.pactworld.org/features/water-management-capacity-building-year-covid-19