



Newsletter of the Unesco Land Subsidence International Initiative

Vol.11 February 2021

Production phase for European Ground Motion Service to begin

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Copernicus Land Monitoring Service is pleased to announce the start of the production phase for the European Ground Motion Service (EGMS).

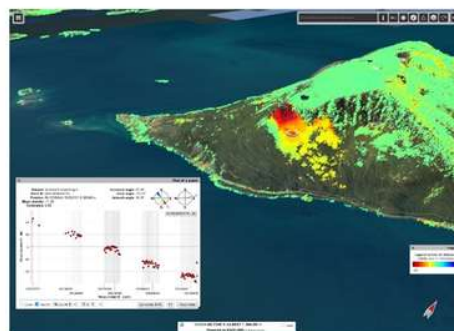
The EGMS constitutes the first application of the interferometric SAR (InSAR) technology for the high-resolution monitoring of ground deformations at a pan-European scale. This is based on full-resolution processing of all Sentinel-1 (S1) satellite acquisitions.

The EGMS will employ the most advanced persistent scatterer (PS) and distributed scatterer (DS) InSAR processing techniques. This will be combined with a high-quality Global Navigation Satellite System (GNSS) model to calibrate the ground motion products.

The first production phase will begin mid-2021 (after the set-up and validation of the whole processing chain is completed).

For the first year the production will be focused on the processing of all S1 acquisitions, starting from the beginning of S1 mission until December 2020. This will be known as the EGMS Baseline product. Early draft products are planned to be available by September 2021, with the complete EGMS baseline product expected to be available to users in Q1 2022.

The figures below show the EGMS coverage and an example of the forthcoming products dissemination portal.



<https://land.copernicus.eu/news/production-phase-for-european-ground-motion-service-to-begin>

AGU Conference, Fall meeting

One of the proposed topics is: Land Subsidence. This does not necessarily mean the person who proposed the topic was volunteering to develop the session proposal. Please contact the committee chair if you are interested in proposing a session. The deadline will be in April.

<https://connect.agu.org/hydrology/about/committees/groundwater>

Shujun Ye is one of the members of the Organizing Committee.

Special Issue

A Special Issue of Remote Sensing: "SAR Imagery for Landslide Detection and Prediction"

With guest editors (between others): Claudia Messina and Roberta Boni.

Deadline for contributions is: July 31st, 2021

https://www.mdpi.com/journal/remotesensing/special_issues/Landslide_Detection_Prediction

New Literature

In Nature following article:

General

Haghi, A.H., Chalaturnyk, R., Blunt, M.J. et al. Poromechanical controls on spontaneous imbibition in earth materials. Sci Rep 11, 3328 (2021). <https://doi.org/10.1038/s41598-021-82236-x>

Indonesia, Jakarta

Mohammad Syamsu Rosid et al.,

MONITORING OF JAKARTA SUBSIDENCE APPLYING 4D MICROGRAVITY SURVEY BETWEEN 2014 AND 2018

February 2021 International Journal of GEOMATE 20(79):132-138

DOI: 10.21660/2021.79.j2031

https://www.researchgate.net/publication/349278128_MONITORING_OF_JAKARTA_SUBSIDENCE_APPLYING_4D_MICROGRAVITY_SURVEY_BETWEEN_2014_AND_2018

Iran,

Alireza Arabameri et al., Comparison of multi-criteria and artificial intelligence models for land-subsidence susceptibility zonation,

Journal of Environmental Management, Volume 284, 2021,112067,ISSN 0301-4797,

<https://doi.org/10.1016/j.jenvman.2021.112067>.

<https://www.sciencedirect.com/science/article/pii/S0301479721001298>)

Italy, Po Delta

Fabris, M. Monitoring the Coastal Changes of the Po River Delta (Northern Italy) since 1911 Using Archival Cartography, Multi-Temporal Aerial Photogrammetry and LiDAR Data: Implications for Coastline

<https://doi.org/10.3390/rs13030529>

Mongolia, Baotou

Weili, G.E., et al., Spatial-temporal Ground Deformation Study of Baotou based on the PS-InSAR Method

<https://doi.org/10.1111/1755-6724.14651>

<https://onlinelibrary.wiley.com/doi/abs/10.1111/1755-6724.14651>

The Netherlands, Framework for economic cost assessment

Sien Kok, Deltares, was the main author of following:

Kok, S., Costa, A.L. Framework for economic cost assessment of land subsidence. Nat Hazards (2021).

<https://doi.org/10.1007/s11069-021-04520-3>

Land subsidence is increasingly recognized as a complex and costly challenge, especially in urban subsidence-prone areas. Often caused by over-extraction of groundwater in order to meet increasing drinking and irrigation water demand, the expected damage from subsidence across the globe runs in the billions of dollars annually. Economic impact assessment can support the development of policy for dealing with subsidence, e.g. in problem analysis and evaluation of strategies. Assessment of the economic costs of subsidence is a key starting point for such analyses. However, research in this area is limited and a standardized economic cost assessment framework is lacking. This is an important basis for sound, comparable and consistent analysis and knowledge transfer across studies. In this paper, we review existing literature and propose a framework for economic cost assessment of land subsidence along the lines of direct and indirect, market and non-market effects.

The Netherlands, Peat areas (in Dutch)

UU researchers Martijn van Gils, Frank Groothuijse, Marleen van Rijswijk and Esther Stouthamer have published an article in the Dutch journal Milieu en Recht (Environment and Law), titled 'Bodemdaling in Nederlandse veengebieden: knelpunten voor solide beleid en besluitvorming external link' (Soil subsidence in Dutch peat meadow areas: challenges for solid policy and decision making). The article is part of a special issue, dedicated to the legal aspects of soil subsidence in

Dutch peat meadow areas. The article is the first output of legal research into soil subsidence that takes place in the context of the research programme NWA-LOSS (Living on Soft Soils, funded from the National Science Agenda).

<https://www.uu.nl/en/news/soil-subsidence-in-dutch-peat-meadow-areas-challenges-for-solid-policy-and-decision-making>

PR China, Beijing

Wang, G. et al., Flood Risk Assessment of Subway Systems in Metropolitan Areas under Land Subsidence Scenario: A Case Study of Beijing. Remote Sens. 2021, 13, 637.

<https://doi.org/10.3390/rs13040637>

<https://www.mdpi.com/2072-4292/13/4/637/pdf>

PR China, Hebei Plain

Xi Li et al., Adjacent-Track InSAR Processing for Large-Scale Land Subsidence Monitoring in the Hebei Plain

Remote Sensing (IF 4.509) Pub Date : 2021-02-21 , DOI: 10.3390/rs13040795

<https://www.x-mol.com/paper/1363624208031322112>

UAE, Remah

Muhagir El Kamali et al., Monitoring of Land Surface Subsidence using Persistent Scatterer Interferometry Techniques and Ground Truth Data in Arid and Semi-Arid Regions, The Case of Remah, UAE,

Science of The Total Environment,2021,145946,ISSN 0048-9697,https://doi.org/10.1016/j.scitotenv.2021.145946.

(<https://www.sciencedirect.com/science/article/pii/S0048969721010135>)

United States, California

TEMESCAL BASIN GROUNDWATER SUSTAINABILITY PLAN

DRAFT HYDROGEOLOGIC CONCEPTUAL MODEL AND GROUNDWATER CONDITIONS

<https://www.coronaca.gov/home/showpublisheddocument?id=19832>

United States, Texas

An inventory report was prepared by the Groundwater Science Advisory Committee:

Groundwater Science Advisory Committee (2021). Review and Recommendations on “Subsidence Investigations –

Phase 1” Report. Prepared for the Regional Groundwater Science Partnership, Houston Advanced Research Center, The Woodlands, Texas, 14 pp

<https://harcresearch.org/wp-content/uploads/2021/02/RGWSP-SAC-Phase-1-Report.pdf>

Vietnam, Hanoi

Luyen K. Bui, Phong V. V. Le, Phuong D. Dao, Nguyen Quoc Nguyen, Hai V. Pham, Hong Ha Tran & Lei Xie (2021) Recent land deformation detected by Sentinel-1A InSAR data (2016–2020) over Hanoi, Vietnam, and the relationship with groundwater level change, *GIScience & Remote Sensing*, DOI: [10.1080/15481603.2020.1868198](https://doi.org/10.1080/15481603.2020.1868198)

From the Press

General, Sinking Cities

The ScienceTimes reports: Cities Around the World Are Sinking Because of Their Colossal Weight.

In the article: <https://www.sciencetimes.com/articles/29686/20210216/cities-around-world-sinking-colossal-weight.htm>

A reference is made to an article from 'The knowledge platform for the "Earth and Environment" research field of the Helmholtz Association'. Reviewed by LaSII member Mahdi Motagh.

<https://www.eskp.de/en/natural-hazards/coastal-cities-are-sinking-dramatically-935926/>

Australia

University of Technology Sydney researchers have developed a solution to protect buildings sitting on deep foundations from earthquakes resulting in surface fault ruptures. Their findings show a composite foundation system using inexpensive polymer materials can significantly improve the safety of infrastructure and substantially decrease fatality and damage due to large ground deformations.



<https://www.uts.edu.au/news/tech-design/ground-breaking-solution-quake-impact>

Indonesia, Jakarta

<https://www.channelnewsasia.com/news/asia/jakarta-flooding-relocation-giant-seawall-anies-baswedan-13864908>

Indonesia, Lighthouse Case Studies

Demak, Indonesia: a partnership between local communities and government for nature-based solutions. The 'Building with Nature' approach aims to rehabilitate the mangrove greenbelt, which protects against coastal erosion, by constructing permeable dams from local natural materials to create new mudflats that mangroves can reclaim. The technique faced challenges because there was too much land subsidence from groundwater extraction. The economic side of the intervention— incentivizing the community to maintain the mangrove greenbelt by improving aquaculture—was a success. An investment of €8 million is on course to achieve break-even within five years.

Look to this 3 minutes movie:

https://www.youtube.com/watch?v=9qYO3opCOJU&ab_channel=Nextblue

Indonesia, Semarang

Flood in Semarang and three alternative solutions

February 25, 2021

Re-posted from FLOWs, the Water Governance Blog at IHE Delft Institute for Water Education

<https://www.nextwatergovernance.net/blog/flood-in-semarang-and-three-alternative-solutions-blog-post-re-posted-from-flows-the-water-blog-at>



Semarang Flood Continues, Council Ask City Government to Immediately Handle Land Subsidence Phenomenon

BY **ABDUL MUGHIS** 26 FEBRUARY 2021

SEMARANG (jatengtoday.com) - Flood management in the city of Semarang should not only blame the weather, heavy rain, and flood deliveries, but must ...

Iran

In Iran, parched lands hollowed by water pumping now sinking.

<https://www.arabnews.com/node/1440986/middle-east>

Nepal, Kathmandu

Groundwater recharge: A tool for replenishing water table

By UTTAM MAHARJAN

<https://thehimalayantimes.com/opinion/groundwater-recharge-a-tool-for-replenishing-water-table>

The Netherlands

In the Netherlands, many older houses have a foundation of wooden piles; these foundations are often in a bad condition:

<https://www.iamexpat.nl/housing/real-estate-news/1-million-houses-risk-subsidence-and-insurance-wont-pay>

Philippines, Manila

Will Metro Manila Sink?

by Catherine Shim | 28-02-2021

<https://tunza.eco-generation.org/resourcesView.jsp?boardID=ambassadorReport&viewID=54446&searchType=&searchName=&pageNumber=2>

Taiwan, Yunlin

Abandoned pig farm in Yunlin turned into modern cocoa farm. As cacao requires only 10% of the water-need, compared with the growing of rice. Cacao farming can be seen as a solution to limit subsidence.

<https://focustaiwan.tw/society/202102160003>

United States, California

California bullet train actually crawling

<https://www.arkansasonline.com/news/2021/feb/28/california-bullet-train-actually-crawling/>

United States, Houston

<https://www.orangeleader.com/2021/02/05/sinking-situation-of-subsidence-in-houston-gulf-coast/>

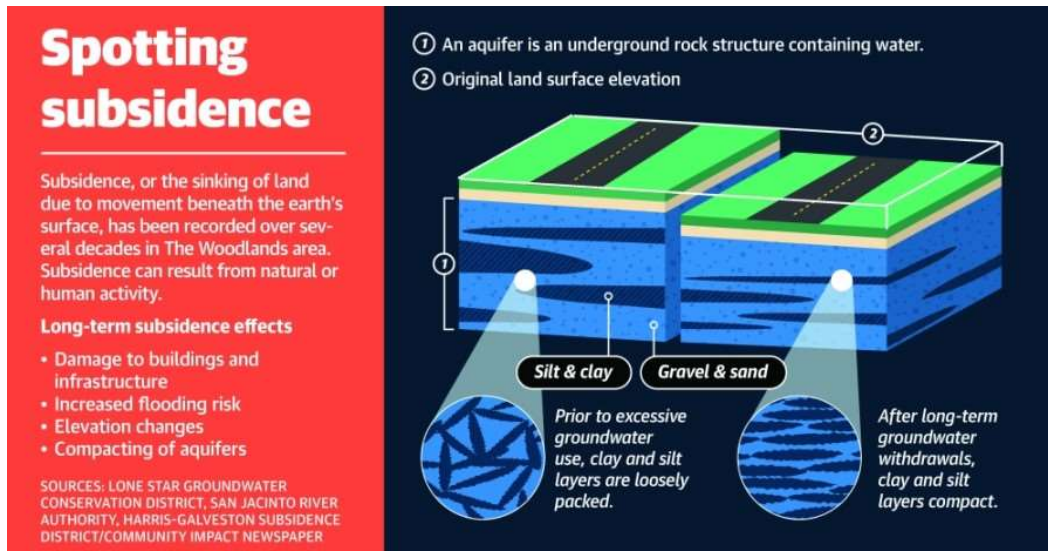
and:

<https://today.tamu.edu/2021/02/08/a-sinking-situation-in-houston-texas-gulf-coast/>

United States. Montgomery County

Subsidence key to Montgomery County's ongoing groundwater debate:

<https://communityimpact.com/houston/the-woodlands/government/2021/02/16/subsidence-key-to-montgomery-countys-ongoing-groundwater-debate/>



United States, San Francisco

Cities Are Sinking Under the Weight of Urban Development

A new study quantifies what big buildings are doing to the ground beneath San Francisco and other cities, as sea levels rise.

By Linda Poon

<https://www.bloomberg.com/news/articles/2021-02-23/big-buildings-can-cause-cities-to-sink-faster>

United States, AGU Award

Matt Lees receives AGU Outstanding Student Presentation Award.

His research explores how declining groundwater levels in California's San Joaquin Valley leads to land subsidence, which causes damage to critical infrastructure, such as canals and aqueducts, that cost millions to repair. Lees helped develop computer models to simulate how the complex relationship between groundwater levels, subsurface structure and subsurface properties leads to land subsidence, or the sinking of the Earth's surface.

<https://earth.stanford.edu/news/matt-lees-receives-agu-outstanding-student-presentation-award#gs.tzmpqz>

Vietnam, Ho Chi Minh City

<https://cyprus-mail.com/2021/02/07/why-is-ho-chi-minh-city-sinking/>

Please send your contributions and comments to: john.lambert@deltares.nl