



Newsletter of the Unesco Land Subsidence International Initiative

Vol. 18 September 2021

New Literature

India, Ahmedabad

Rakesh K. Dumka, D. Suribabu & Sandip Prajapati (2021) PSI and GNSS derived ground subsidence detection in the UNESCO Heritage City of Ahmedabad, Western India, Geocarto International, DOI: 10.1080/10106049.2021.1980618

<https://www.tandfonline.com/doi/full/10.1080/10106049.2021.1980618>

Iran, Qom Province

Zohreh Masoumi, Zahra Mousavi & Zahra Hajeb (2021) Long-term investigation of subsidence rate and its environmental effects using the InSAR technique and geospatial analyses, Geocarto International, DOI: 10.1080/10106049.2021.1964616

<https://www.tandfonline.com/doi/full/10.1080/10106049.2021.1964616>

Italy, Napoli

Marco Valerio Nicotera et al., Monitoring a deep excavation in pyroclastic soil and soft rock, Tunnelling and Underground Space Technology, Volume 117, 2021, 104130, ISSN 0886-7798,

<https://doi.org/10.1016/j.tust.2021.104130>.

<https://www.sciencedirect.com/science/article/pii/S0886779821003217>)

Abstract: The completion of the downtown stretch of Line 1 of the Napoli (Italy) underground involved the construction of a number of stations in the historic centre of the city, including the Università station. This station consists of two shafts excavated with the protection of reinforced concrete diaphragms, and two platform tunnels. The main shaft reaches the line tunnels excavated with TBMs in the formation of the Neapolitan Yellow Tuff, at a depth of more than 36 m below ground level and more than 33 m below the groundwater table; excavations of the shaft involved loose materials for a depth of 23 m, and the Neapolitan Yellow Tuff formation for the remaining. The two platform tunnels, each of them consisting in two separate stretches about 50 m long, were excavated from the main shaft using the Artificial Ground Freezing technique to guarantee

excavation stability and hydraulic seal. The paper presents the main results of the monitoring carried out along the whole complex construction process for a total duration of about seven years; the presented data consists of: measurements of pore water pressures inside and outside the excavations; measurements of displacement of retaining structures and ground-anchors forces; temperature measurements in the vicinity of the freezing probes around the tunnels excavation to check the frozen ring formation; measurements of subsidence of surrounding buildings. The case history is a very complete one and valuable lessons are learnt on the effectiveness of the construction techniques further than on the design methodologies adopted. Qualitative and quantitative relationships among the various sets of measurements are also outlined, such an aspect representing a valuable feature of the presented case history.

Italy, Volturno River Mouth

Busico, G. et al., Actual and Forecasted Vulnerability Assessment to Seawater Intrusion via GALDIT-SUSI in the Volturno River Mouth (Italy). *Remote Sens.* 2021, 13, 3632.

<https://doi.org/10.3390/rs13183632>

<https://www.mdpi.com/2072-4292/13/18/3632/pdf>

Italy, Venice

Davide Zanchettin et al.,

Sea-level rise in Venice: historic and future trends (review article)

<https://nhess.copernicus.org/articles/21/2643/2021/nhess-21-2643-2021.html>

Kenya, Nairobi

Sahadevan, D.K., Pandey, A.K. DInSAR-based monitoring of land subsidence related to groundwater over-exploitation: example from developing urban center of Nairobi, Kenya. *Hydrogeol J* (2021).

<https://doi.org/10.1007/s10040-021-02384-2>

PR China, Bohai Bay

Li, J., Shang, Z., Wang, F. et al. Holocene sea level trend on the west coast of Bohai Bay, China: reanalysis and standardization. *Acta Oceanol. Sin.* 40, 198–248 (2021).

<https://doi.org/10.1007/s13131-021-1730-5>

PR China, Changzou

Qing hao Liu et al., HLSTM:Heterogeneous Long Short-Term Memory Network for Large-scale InSAR Surface Subsidence Prediction

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

DOI: 10.1109/JSTARS.2021.3106666

https://www.researchgate.net/publication/354112082_HLSTMHeterogeneous_Long_Short-Term_Memory_Network_for_Large-scale_InSAR_Surface_Subsidence_Prediction

PR China, Qinghai Province

Luo, S. et al., An Improved Method for Automatic Identification and Assessment of Potential Geohazards Based on MT-InSAR Measurements.

Remote Sens. 2021, 13, 3490.

<https://doi.org/10.3390/rs13173490>

<https://www.mdpi.com/2072-4292/13/17/3490/pdf>

PR China, Taiyuan Basin

Yang, C., Wei, Y., Xu, Q. et al. Large-area ground deformation investigation over Taiyuan Basin, China 2007–2011 revealed by ALOS PALSAR imagery. Arab J Geosci 14, 2055 (2021).

<https://doi.org/10.1007/s12517-021-08325-3>

USA, California

Jules Bernstein, University of California - Riverside

Critical groundwater supplies may never recover from drought

<https://www.eurekalert.org/news-releases/930035>

USA, Louisiana



The screenshot shows the ESA Earthnet Online website. The header includes the ESA logo and 'earthnet online' text, with the European Space Agency logo on the right. The navigation menu includes 'ESA', 'Earth Home', 'Missions', 'Data Products', 'Resources', and 'Applications'. The main content area displays a workshop presentation abstract titled 'The application of multi-temporal, multiple-satellite, C- and L-band SAR data for the analysis of backscattering variations, InSAR-derived water-level changes over swamp forests, and subsidence over Southeastern Louisiana' by Ohig Kwoun⁽¹⁾ and Zhong Lu⁽²⁾. The abstract text describes the use of multi-temporal European Remote Sensing Satellite 1 and 2 (ERS-1/2), Environment Satellite (ENVISAT), Canadian RADARSAT-1, and Japanese ALOS Synthetic Aperture Radar (SAR) images for ecological, hydrological, and geological studies over Southeastern Louisiana. The abstract discusses seasonal changes in SAR backscatter and interferometric coherence, temporal variation of radar backscattering signal during leaf-off season, and the use of both C-band and L-band SAR images to measure changes in water-level beneath swamp forests. The abstract concludes by stating that the study demonstrates the importance of SAR data for understanding this coastal flood zone and the associated ecological, hydrological and geological processes. A link for 'Workshop presentation' is provided at the bottom of the abstract.

https://earth.esa.int/workshops/fringe07/participants/231/pres_231_kwoun.pdf

Gives access to the workshop presentation.

Vietnam, Ca Mau

Di Giusto, B. et al., Development versus Adaptation? Facing Climate Change in Ca Mau,

Vietnam. Atmosphere 2021, 12, 1160.<https://doi.org/10.3390/atmos12091160>

<https://www.mdpi.com/2073-4433/12/9/1160/pdf>

Vietnam, Mekong Delta

Schmitt RJP, Giuliani M, Bizzi S, Kondolf GM, Daily GC, Castelletti A. Strategic basin and delta planning increases the resilience of the Mekong Delta under future uncertainty. Proc Natl Acad Sci U S A. 2021 Sep 7;118(36):e2026127118. doi: 10.1073/pnas.2026127118. PMID: 34475204.

<https://pubmed.ncbi.nlm.nih.gov/34475204/>

Mining Activities

General

Bowen Chi, Hongdong Fan, Yantao Gao, Lifeng Zhao & Huifu Zhuang (2021) A distributed scatterers InSAR method based on adaptive window with statistically homogeneous pixel selection for mining subsidence monitoring, Geocarto International, DOI: 10.1080/10106049.2021.1985626

<https://www.tandfonline.com/doi/full/10.1080/10106049.2021.1985626?scroll=top&needAccess=true>

PR China, Fengfeng Area

Yueguan Yan et al.,

Ground Subsidence Evolution from 1000 m Deep Mining: A Case Study in Fengfeng Mining Area

<https://www.hindawi.com/journals/sv/2021/9942968/>

Modelling

Weitao Yang; Jin Xu; One-dimensional consolidation of multilayered aquifer systems with viscoelastic properties induced by time-dependent groundwater drawdown

Quarterly Journal of Engineering Geology and Hydrogeology (2021) qjegh2021-073.

<https://doi.org/10.1144/qjegh2021-073>

Monitoring

Xu, C. et al., Sensor Placement with Two-Dimensional Equal Arc Length Non-Uniform Sampling for

Underwater Terrain Deformation, Monitoring. J. Mar. Sci. Eng. 2021, 9, 954.

<https://doi.org/10.3390/jmse9090954>

<https://www.mdpi.com/2077-1312/9/9/954/pdf>

Angélique Melet

European Copernicus Services to Inform on Sea-Level Rise Adaptation: Current Status and Perspectives

Front. Mar. Sci., 03 September 2021 | <https://doi.org/10.3389/fmars.2021.703425>

From the Press

Indonesia, Jakarta

Anies Calls Land Subsidence in Jakarta Down to 5 Points

<https://www.archyworldys.com/anies-calls-land-subsidence-in-jakarta-down-to-5-points/>

Jakarta's Muara Baru May Sink 4.6 Meters Below Sea Level in 2050

<https://en.tempo.co/read/1501970/jakartas-muara-baru-may-sink-4-6-meters-below-sea-level-in-2050>

SDA Agency Proposes Budget for Clean Water Subsidy

<https://www.beritajakarta.id/en/read/41435/sda-agency-proposes-budget-for-clean-water-subsidy>

Iran

Subsidence Destroys Iran's Economy and Future Generations, By SIA RAJABI, SEPTEMBER 5, 2021

<https://www.iranfocus.com/en/economy/47521-subsidence-destroys-irans-economy-and-future-generations/>

the Netherlands, Oud Ade

Unique research project in polder Oud Ade

<https://www.miragenews.com/unique-research-project-in-polder-oud-ade-625190/>

the Netherlands, Waddenzee

International Conservation Group Condemns Waden Sea Gas Drilling Program

<https://netherlandsnewslive.com/international-conservation-group-condemns-waden-sea-gas-drilling-program/235703/>

PR China

China's mega water diversion project benefits 140 mln people

http://www.news.cn/english/2021-09/09/c_1310177451.htm

USA, Louisiana

How sea-level rise is making hurricanes like Ida more destructive

<https://grist.org/extreme-weather/how-sea-level-rise-is-making-hurricanes-like-ida-more-destructive/>

Port Fourchon Staggered by a Direct Hit From Ida: How Long Can the Oil Port Remain Above Water?

<https://jpt.spe.org/port-fourchon-staggered-by-a-direct-hit-from-ida-how-long-can-the-oil-port-remain-above-water>

Vietnam, Mekong Delta

R. J. P. Schmitt et al.,

Strategic basin and delta planning increases the resilience of the Mekong Delta under future uncertainty.

PNAS September 7, 2021 118 (36) e2026127118; <https://doi.org/10.1073/pnas.2026127118>

<https://www.pnas.org/content/118/36/e2026127118.short?rss=1>

Projects

Student who wants to 'save' the Mekong Delta wins scholarship in Europe

https://vietnamnet.vn/en/feature/student-who-wants-to-save-the-mekong-delta-wins-scholarship-in-europe-771693.html?vnn_source=trangchu&vnn_medium=box-english1

the Netherlands, Utrecht University position

Project: Groundwater extraction-induced land subsidence in the Yangtze River

Delta, China: towards a coupled hydrogeological-subsidence model

Enabling the final step towards a delta-covering subsidence model

Department: Physical Geography

Research group: Global Change Geomorphology - Delta Evolution & subsurface processes

Supervisor: Dr Esther Stouthamer & Pepijn van Elderen MSc

Email address: E.stouthamer@uu.nl, P.vanelderen@uu.nl

<https://www.uu.nl/sites/default/files/PG%20-%20Groundwater%20extraction-induced%20land%20subsidence.pdf>