

Newsletter of the Unesco Land Subsidence International Initiative

Vol.7 October 2020

News from LaSII

However a physical annual meeting was not possible, UNESCO LaSII had its annual meeting in a virtual way. During this meeting, the board of LaSII was changed. The new chair for the next 5 years will be Pietro Teatini from Italy, who has the difficult task to guide LaSII during the next 5 years of uncertainty because of the effects of COVID-19, which already was the reason to postpone TISOLS. He will be assisted by the new vice-chair, Shujun Ye, from the People's Republic of China. The leaving chair Dora Carreon-Freyre, from Mexico, will continue as a member. Dora has guided LaSII during the past 5 years and was one of the driving forces in transformation from a Working Group into an International Initiative. LaSII will also have a new Technical Secretary, Margreet van Marle from the Netherlands.

News

Great Britain, BGS GeoSure

The British Geological Survey publishes geohazard maps with 5 km² scale maps that indicate geohazards, including Land Subsidence.

Have a look on: https://www2.bgs.ac.uk/products/geosure/home.html



Indonesia

Dr. Suchi Gopal Selected as Visiting Professor to Indonesia, World Class Professor Program

Professor Suchi Gopal has been selected as a Visiting Professor in the Ocean and Coastal Remote Sensing, Integrated Laboratory, Diponegoro University (UNDIP) in Northern Central Java, Semarang, Indonesia, under the World Class Professor (WCP) program initiated by the Ministry of Education and Culture of the Republic of Indonesia. This award will help Professor Gopal assist in research and publications related to land subsidence impact on coastal flooding based on remote sensing and geospatial modeling data in Semarang.

https://www.bu.edu/earth/2020/10/05/dr-suchi-gopal-selected-as-visiting-professor-to-indonesiaworld-class-professor-program/

A webinar (about 25 minutes, in Indonesian language) about monitoring of infrastructure can be seen, following this link:

https://www.youtube.com/watch?v=tXXD3oyF9c&ab_channel=PusatPemanfaatanPenginderaanJauhLAPAN

Italy, Venice

The flood barrier in Venice is ready!



Thailand, Bangkok

Free download: Land Subsidence Analysis In Urban Areas The Bangkok Books <u>https://uncoverehk.web.app/land-subsiden-f38wt.html</u>

USA, Arizona

A lot of hydrologic, subsidence and earth fissure information for Arizona can be found: <u>https://new.azwater.gov/news/articles/2020-08-10</u>

Water use in each basin and crop-acreage data has also been compiled from information provided by the <u>US Geological Survey</u> for 2016. In conjunction with groundwater levels, water use helps us understand how pumping affects groundwater levels.

Precipitation and surface water data were also compiled for this report for the time period October 2016 - June 2017. The report also includes compilations of current water use data from USGS annual water-use reports, depth-to-bedrock data, and **land subsidence/earth fissure** monitoring data.

Arizona's hydrologic data collection activities are fundamental components of the state's <u>Strategic</u> <u>Vision for Water Supply Sustainability</u>.

And a research project was started in October 2020.

Hampton University Professor Dr. William B. Moore Teams up with USGS and Virginia Tech to Study Land Subsidence

10/19/2020 - #68

HAMPTON, Va. (October 19, 2020) – Dr. William B. Moore, Associate Professor in the Hampton University Department of Atmospheric and Planetary Sciences, along with several students, is part of a group of scientists that piloted and developed a land subsidence survey project. The purpose of the project is to better isolate short-term changes in land subsidence due to human activities from long-term geological signals due to glacial cycles and deep Earth processes.

<u>http://news.hamptonu.edu/release/Hampton-University-Professor-Dr%5E-William-B%5E-Moore-</u> <u>Teams-up-with-USGS-and-Virginia-Tech-to-Study-Land-Subsidence</u>

New Literature

General, deltas

G. Vasilopoulos et al., Anthropogenic sediment starvation forces tidal dominance in a mega-delta

file:///E:/F.%20Other%20information/WG%20Land%20Subsidence/NEWSLETTER/VOLUME7/anthrop ogenic%20sedimentstarvation.pdf

Germany

Our observer, Mahdi Motagh was co-author of following article in 'International Journal of Applied Earth Observation and Geoinformation.

Wei Tang et al., Monitoring active open-pit mine stability in the Rhenish coalfields of Germany using a coherence-based SBAS method,

https://www.sciencedirect.com/science/journal/03032434

Indonesia, Kota Semarang

This is a nice youtube movie of 10 minutes about land subsidence, in Indonesian language.

https://www.youtube.com/embed/-KTTTZCLVhY

Iran, Aliabad Plain

Ali Edalat et al., in Environmental Earth Sciences, 21/2020:

Scenarios to control land subsidence using numerical modeling of groundwater exploitation: Aliabad plain (in Iran) as a case study

Iran, Gharabolagh Plain

Najafi, Z., Pourghasemi, H.R., Ghanbarian, G. *et al.* Land-subsidence susceptibility zonation using remote sensing, GIS, and probability models in a Google Earth Engine platform. *Environ Earth Sci* **79**, 491 (2020). https://doi.org/10.1007/s12665-020-09238-2

Iran, Tehran

Zahra Chatrsimab et al.,

https://www.x-mol.com/paperRedirect/1318714872710795264

<u>Development of a Land Subsidence Forecasting Model Using Small Baseline Subset—Differential</u> <u>Synthetic Aperture Radar Interferometry and Particle Swarm Optimization—Random Forest (Case</u> <u>Study: Tehran-Karaj-Shahriyar Aquifer, Iran)</u>

Iran, Varamin Plain

Nayyeri, M., Hosseini, S.A., Javadi, S. *et al.* Spatial Differentiation Characteristics of Groundwater Stress Index and its Relation to Land Use and Subsidence in the Varamin Plain, Iran. *Nat Resour Res* (2020). <u>https://doi.org/10.1007/s11053-020-09758-5</u>

https://link.springer.com/article/10.1007/s11053-020-09758-5

Italy, Venice Lagoon

Our members Pietro and Luigi published:

Teatini P., Tosi L., Strozzi T. (2014) Capability of X-Band Persistent Scatterer Interferometry to Monitor Land Subsidence in the Venice Lagoon. In: Lollino G., Manconi A., Locat J., Huang Y., Canals Artigas M. (eds) Engineering Geology for Society and Territory – Volume 4. Springer, Cham. <u>https://doi.org/10.1007/978-3-319-08660-6_33</u>

the Netherlands, Amsterdam

Amsterdam published a plan for climate adaptation:

https://assets.amsterdam.nl/publish/pages/867626/climate_adaptation.pdf

Pakistan, Abbottabad City

From Remote Sensing: from this paper can be derived that subsidence rates until 6.5 cm/yr are present, partly caused by groundwater extraction.

Naeem Shahzad et al., Ground Deformation and Its Causes in Abbottabad City, Pakistan from Sentinel-1A Data and MT-InSAR

https://www.mdpi.com/2072-4292/12/20/3442/pdf

PR China, Beijing

Li, H., Zhu, L., Guo, G., Zhang, Y., Dai, Z., Li, X., Chang, L., and Teatini, P.: Land Subsidence due to groundwater pumping: Hazard Probability Assessment through the Combination of Bayesian Model and Fuzzy Set Theory, Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2020-309, in review, 2020.

https://nhess.copernicus.org/preprints/nhess-2020-309/

PR China, Jining City (Shandong)

Longcang S., Qingyi S., Xuming P., Zhonghui W. (2000) Analysis on Influence Factors of Sustainable Groundwater Development in Jining City, Shandong Province, CHINA. In: Sato K., Iwasa Y. (eds) Groundwater Updates. Springer, Tokyo. <u>https://doi-org-443.webvpn.jnu.edu.cn/10.1007/978-4-431-68442-8_73</u>

PR China, North China Plain

Min Shi et al., in Remote Sensing: Recent Ground Subsidence in the North China Plain, China, Revealed by Sentinel-1A Datasets.

Describes land subsidence rates until more than 16 cm/yr, caused by groundwater extraction. In contrary, also uplift (until about 1 cm/yr) was observed, due to geological discontinuities.

https://www.mdpi.com/2072-4292/12/21/3579/pdf

PR China, Tanjin province

Ha, D., Zheng, G., Loáiciga, H.A. *et al.* Long-term groundwater level changes and land subsidence in Tianjin, China. *Acta Geotech.* (2020). <u>https://doi.org/10.1007/s11440-020-01097-2</u>

Taiwan, Choshui River

Chiao-Yin Lu et al., in Remote Sensing

The Relationship between Surface Displacement and Groundwater Level Change and Its Hydrogeological Implications in an Alluvial Fan: Case Study of the Choshui River, Taiwan Chiao-Yin Lu

https://www.mdpi.com/2072-4292/12/20/3315/pdf

Thailand, Bangkok

A PhD study from: DR. CHANITA DUANGYIWA

https://www.chinawaterrisk.org/interviews/the-present-future-flood-risks-in-bangkok/

USA, California

Morgan C. Levy et al 2020 Environ. Res. Lett. 15 104083

Fine-scale spatiotemporal variation in subsidence across California's San Joaquin Valley explained by groundwater demand

https://iopscience.iop.org/article/10.1088/1748-9326/abb55c/pdf

USA, Texas

With contributions from Devin:

Liu, Y., Li, J., Fasullo, J. *et al.* Land subsidence contributions to relative sea level rise at tide gauge Galveston Pier 21, Texas. *Sci Rep* **10**, 17905 (2020). <u>https://doi.org/10.1038/s41598-020-74696-4</u>

https://www.nature.com/articles/s41598-020-74696-4#citeas

From the Press

Iran, Tehran

https://financialtribune.com/articles/energy/105851/tehran-water-treatment-capacity-rising

The treated water is injected in order to decrease subsidence

New Zealand, Waikato

Also in New Zealand, Land Subsidence of peatland is a topic:

Aerial Surveying For Peat Subsidence Taking

https://www.scoop.co.nz/stories/AK2010/S00147/aerial-surveying-for-peat-subsidence-taking-flight.htm

United States, California

Michelle sent following interesting link:

https://news.mst.edu/2020/09/research-links-sinking-land-to-regions-of-high-groundwater-demand/

Research links sinking land to regions of high groundwater demand

Posted by Nancy Bowles

Others have investigated the link between land use and land subsidence in California:



Satellite data shows variability in intensity of groundwater use for crops

https://vegetablegrowersnews.com/news/satellite-data-shows-variability-in-intensity-of-groundwater-use-forcrops/



Images indicate the estimated rate of land subsidence in areas with high groundwater use in the western U.S.

Groundwater levels in Coachella Valley are increasing reports the California Water news daily: http://californiawaternewsdaily.com/drought/groundwater-increasing-in-coachella-valley-according-to-usgs-report/

United States, Indian Wells

If all goes according to plan, recycled water from the city's planned \$45 to \$60 million wastewater treatment facility (WWTF) may be used to help balance the Indian Wells Valley groundwater basin as mandated by the state's Sustainable Groundwater Management Act.

https://www.taftmidwaydriller.com/news/20201024/could-recycled-water-help-balance-basin

United States, Maryland

Maryland is often called "America in Miniature": In the western region, we have mountainous terrain subject to flooding from ice jams and snow melt; the central region is more developed and susceptible to urban and flash flooding; and the south and east experience coastal flooding, nuisance or tidal flooding, and storm surge. These flood risks are compounded by erosion and land subsidence.



Flood waters cover a residential street in Ocean City, Maryland on October 3, 2015. The Maryland Emergency Management Agency provides voluntary buyout opportunities for owners of repeatedly flooded properties in high-flood-risk areas.

<u>https://www.pewtrusts.org/fr/research-and-analysis/articles/2020/10/13/maryland-flood-risk-leads-property-owners-communities-to-accept-buyouts</u>

United States, Suffolk NY

The Hampton Roads Sanitation District has received a \$225 million federal loan that will help pay for the first major water reuse program on the East Coast.

https://www.suffolknewsherald.com/2020/10/13/hrsd-secures-financing-for-swift/

For more detailed information:

<u>https://www.epa.gov/sites/production/files/2020-</u> 10/documents/hrsd_wifiaprojectfactsheet_loanclose.pdf

Comments and contributions can be sent to: john.lambert@deltares.nl