United Nations Educational, Scientific and Cultural Organization

Intergovernmental Hydrological Programme

UNESCO Land Subsidence International Initiative

Newsletter of the Unesco Land Subsidence International Initiative

Vol. 14 April 2021

New Literature

https://www.frontiersin.org/articles/10.3389/feart.2021.663678/full

https://www.mdpi.com/2072-4292/13/10/1902

https://sentinels.copernicus.eu/web/sentinel/news

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Egypt, Alexandria

Darwish, N. et al. Assessing the Accuracy of ALOS/PALSAR-2 and Sentinel-1 Radar Images in Estimating the Land Subsidence of Coastal Areas: A Case Study in Alexandria City, Egypt. Remote Sens. 2021, 13, 1838.

https://www.mdpi.com/2072-4292/13/9/1838/pdf

Finland, peatlands

Lauri Ikkala et al., Peatland subsidence enhances cultivated lowland flood risk, Soil and Tillage Research, Volume 212, 2021, 105078, ISSN 0167-1987,

https://doi.org/10.1016/j.still.2021.105078.

(https://www.sciencedirect.com/science/article/pii/S0167198721001483)

Abstract: Peatlands worldwide are being threatened by intensive land use and drainage, which leads to soil subsidence. This has consequences for farming, especially on low-gradient cultivated peat-dominated lowlands with high flood risk. In this study, we combined historical soil elevation data and new lidar data to improve the estimation of subsidence and its consequences for lowland river systems. The results showed 202–349 mm subsidence within the last 24–51 years, with a mean rate of 5.15–9.47 mm y−1 for riparian peatland on the west coast of Finland. The subsidence rate was partly explained by the depth of the organic soil layer (R2 = 0.710, p > 0.05). The results also showed that increasing flooding of cultivated fields is mainly due to soil subsidence, not to increased flooding occurrence in river systems. The area flooded annually was found to increase by 101–194 % for the last 24–51 years, due to soil subsidence near rivers. Generalization of the results to catchment scale indicated an increase in the annual flood zone of 45 % in cultivated fields in one of two study catchments (Siikajoki river basin). These results demonstrate the value of using historical data to study soil subsidence and confirm that the risk of flooding increases in cultivated organic lowlands due to intensive drainage and subsidence. New management strategies, such as peatland rewetting, restoration, and paludiculture, should be considered in future land use plans to reduce subsidence and provide new income streams for farmers.

India

Following is a chapter from the book: Groundwater Resources Development and Planning in the Semi-Arid Region.

Sambare R., Singh V., Jain S.K. (2021) Groundwater Resources Management Using Remote Sensing and GIS. In: Pande C.B., Moharir K.N. (eds) Groundwater Resources Development and Planning in the Semi-Arid Region. Springer, Cham. https://doi.org/10.1007/978-3-030-68124-1_19

India, Delhi

Tiwari, D.K. et al., Groundwater extraction-induced seismicity around Delhi region, India. Sci Rep 11, 10097 (2021). https://doi.org/10.1038/s41598-021-89527-3

Iran, Orzuiyeh Plain

Mahdi Emambakhsh, Investigation of land Subsidence in Orzuiyeh Plain of Kerman Using Radar Differential Interference Method (DINSAR).

https://civilica.com/doc/1195125/

Indonesia, Jakarta

D Nurulhuda et al 2021 IOP Conf. Ser.: Earth Environ. Sci. 778 012013

Living with risk: Kampung Apung's adaptation to flood

https://iopscience.iop.org/article/10.1088/1755-1315/778/1/012013

Iran, Yazd-Ardakan Plain

Sayyed Mohammad Javad Mirzadeh et al., Characterization of Irreversible Land Subsidence in the Yazd-Ardakan Plain, Iran from 2003-2020 InSAR Time Series.

https://www.essoar.org/doi/10.1002/essoar.10506902.1

Italy, Venice

Claudia Zoccarato et al.,

The Holocene influence on the future evolution of the Venice Lagoon tidal marshes.

https://www.nature.com/articles/s43247-021-00144-4

Malaysia, Penang

Gao, G.; San, L.H.; Zhu, Y. Flood Inundation Analysis in Penang Island (Malaysia) Based on InSAR Maps of Land Subsidence and Local Sea Level Scenarios. Water 2021, 13, 1518.
https://doi.org/10.3390/w13111518

https://www.mdpi.com/2073-4441/13/11/1518

Monitoring

Among others, Kelvin and Michelle collaborated in following:

Hung, Wei-Chia, Hwang, Cheinway, Sneed, Michelle, Chen, Yi-An, Chu, Chi-Hua, and Shao-Hung Lin, 2021, Measuring and interpreting multilayer aquifer-system compactions for a sustainable groundwater-system development, Water Resources Research, v. 57, e2020WR028194.
https://doi.org/10.1029/2020WR028194

the Netherlands, peatlands

van den Berg, M. et al., Which management option has the highest greenhouse gas reduction potential for drained peatlands?, EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-8175, https://doi.org/10.5194/egusphere-egu21-8175, 2021.

https://meetingorganizer.copernicus.org/EGU21/EGU21-8175.html

Statistics Netherlands and WUR (2021), Natural Capital Accounting in the Netherlands –

Technical report. Statistics Netherlands (CBS) and Wageningen University and Research (WUR)

https://www.cbs.nl/-/media/_pdf/2021/22/nca-nl-technical-report-2021.pdf

Pakistan, Abbottabad

Rehan Khan et al., Monitoring Subsidence in Urban Area by PSInSAR: A Case Study of Abbottabad City, Northern Pakistan

https://www.mdpi.com/2072-4292/13/9/1651/review_report

PR China

Climate risk country profile: China

SOURCE(S): ASIAN DEVELOPMENT BANK (ADB)

WORLD BANK, THE (WB)

https://www.adb.org/sites/default/files/publication/703641/climate-risk-country-profile-china.pdf

PR China, Beijing

Peng, Z. et al., Ecological Compensation Standard of a Water-Receiving Area in an Inter-Basin Water Diversion Based on Ecosystem Service Value and Public Willingness: A Case Study of Beijing. Sustainability 2021, 13, 5236. https://doi.org/10.3390/su13095236

Turkey, Konya Basin (See also: from the Press)

Hande Mahide Yeşilmaden et al., Land subsidence assessment under excessive groundwater pumping using ESA Sentinel-1 satellite data: a case study of Konya Basin, Turkey

https://link.springer.com/article/10.1007/s12665-021-09718-z

Vietnam, Mekong Delta

Yuen, K. W. et al., Interacting effects of land-use change and natural hazards on rice agriculture in the Mekong and Red River deltas in Vietnam, Nat. Hazards Earth Syst. Sci., 21, 1473–1493, https://doi.org/10.5194/nhess-21-1473-2021, 2021.

https://nhess.copernicus.org/articles/21/1473/2021/

From the Press

France

Subsidence disaster recognised in 70 communes.

A 'catastrophe naturelle' has been recognised in 70 communes in 12 departments, after subsidence caused by the rehydration of drought-affected land in 2016.

https://www.connexionfrance.com/French-news/Subsidence-disaster-recognised-in-70-communes

Iran

The Catastrophe of Iran’s Groundwater Resources Will Take Thousands of Years To Overcome

https://www.iranfocus.com/en/life-in-iran/46881-the-catastrophe-of-irans-groundwater-resources-will-take-thousands-of-years-to-overcome/

Mexico, Mexico City

https://www.thesun.co.uk/tech/14881201/mexico-city-sinking-unstoppable/

and: Enrique in the News:

https://www.wired.com/story/mexico-city-could-sink-up-to-65-feet/

PR China

Sea Level Rise Along China’s Coast Poses Risk of Geological Disasters

https://www.theepochtimes.com/sea-level-rise-along-chinas-coast-poses-risk-of-geological-disasters_3800011.html

Turkey, Konya


LOCAL NEWS

Large sinkhole appears in central Turkey, spreading fear among locals

17:33 May 31, 2021 · AA

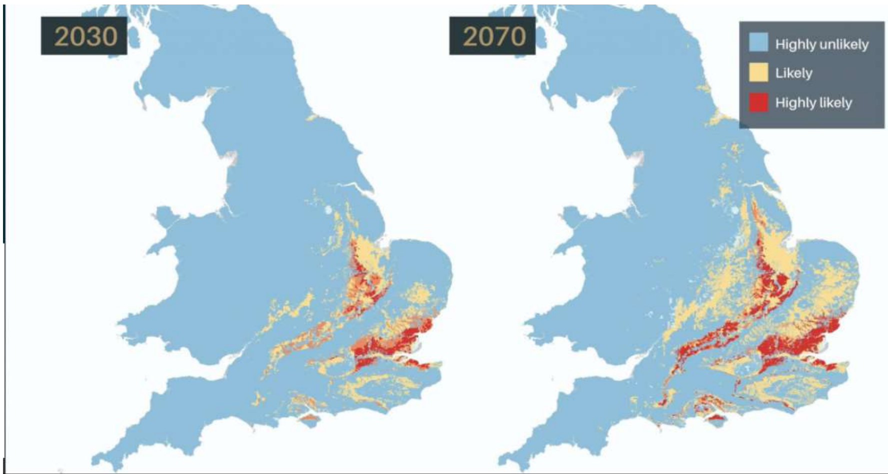
Turkey's central province of Konya distinguishes with more than 300 sinkholes that look like something out of a sci-fi movie, created by geological factors, and the increase in the use of groundwater that leads to land subsidence. On Sunday (May 30) a large sinkhole measured three meters in diameter and 65 meters in depth opened up in a clover field in Karapinar District, spreading fear among locals living in the area.

https://www.yenisafak.com/en/video-gallery/news/large-sinkhole-appears-in-central-turkey-spreading-fear-among-locals-3573460

UK

Millions of homes are at risk of subsidence in the next fifty years as a result of climate change, the British Geological Survey (BGS) has warned.

https://news.sky.com/story/climate-change-millions-of-homes-at-risk-of-subsidence-by-2070-warns-british-geological-survey-12310644



3/3 Map of regions in Great Britain projected to be affected by clay shrink-swell according to GeoClimate data from the British Geological Survey © BGS/UKRI

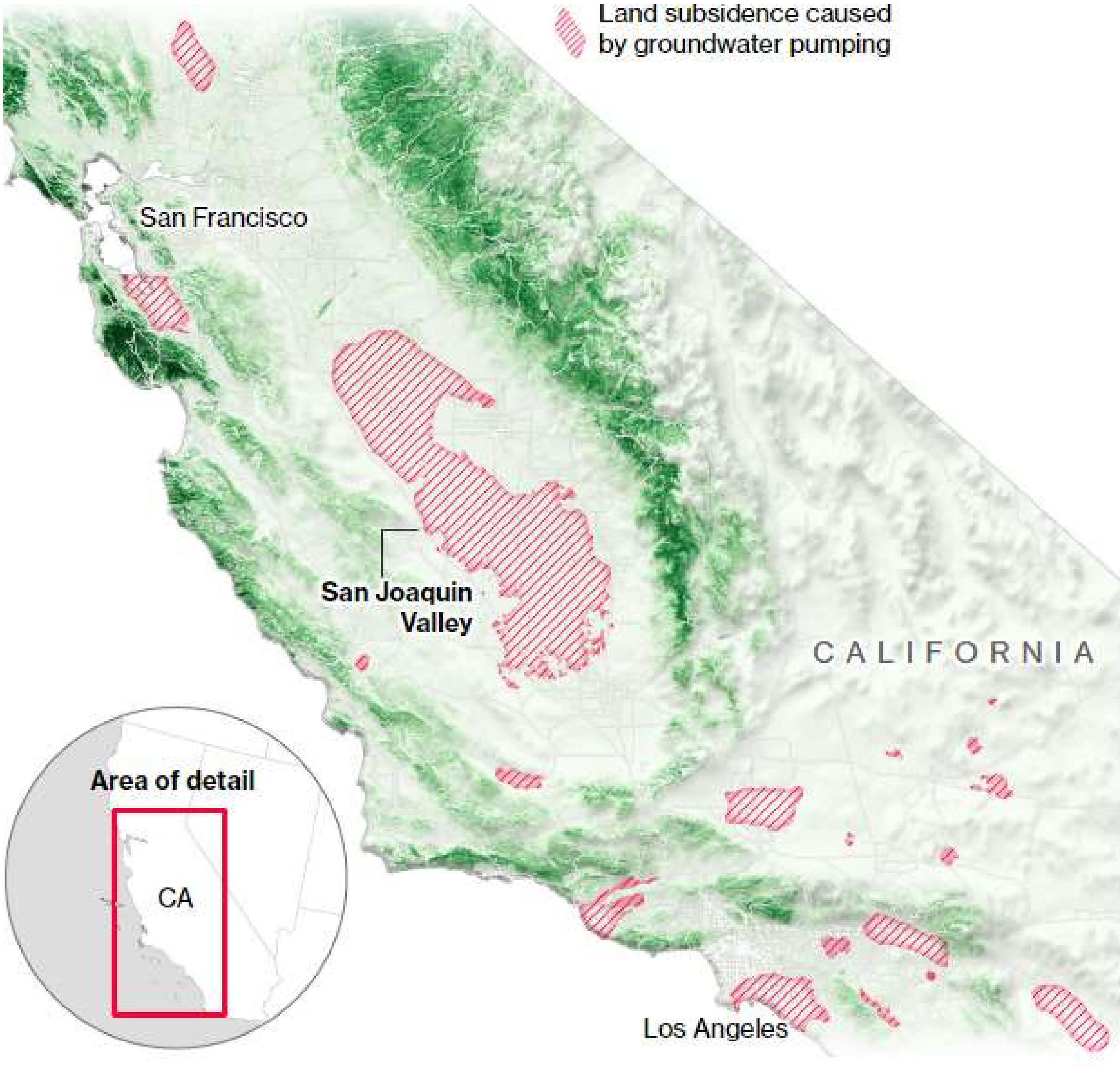
https://www.geplus.co.uk/news/bgs-maps-show-real-threat-of-subsidence-to-british-homes-and-properties-19-05-2021/

USA, Oil extraction
Does oil drilling cause sinkholes or earthquakes?

https://www.blueridgeoutdoors.com/go-outside/does-oil-drilling-cause-sinkholes-or-earthquakes/

USA, California
The Central California Town That Keeps Sinking:

https://www.nytimes.com/2021/05/25/us/corcoran-sinking-agriculture-water.html



https://www.bloomberg.com/toaster/v2/charts/17f24b67f76942ac9e1acc4c9b9be126?hideLogo=true&hideTitles=true&web=true&

Neely, W. R., Borsa, A. A., Burney, J. A., Levy, M. C., Silverii, F., & Sneed, M. (2021). Characterization of groundwater recharge and flow in California's San Joaquin Valley from InSAR-observed surface deformation. Water Resources Research, 57, e2020WR028451. https://doi.org/10.1029/2020WR028451

USA, Louisiana
May 20, 2021, by Eldin Ganic

Louisiana Governor John Bel Edwards yesterday announced three large-scale coastal restoration projects are now under construction to restore more than 2,900 acres of beach, dune, marsh and ridge in four parishes in Southeast Louisiana.

https://www.offshore-energy.biz/governor-edwards-long-term-approach-to-creating-a-sustainable-coast/

USA, Utah

Synthetic Aperture Radar (SAR) Data from NASA's ASF DAAC helps scientists like Dr. Steve Bowman provide Utah's citizens with timely scientific information about the state's geologic hazards.

https://earthdata.nasa.gov/learn/user-resources/who-uses-nasa-earth-science-data-user-profiles/user-profile-dr-steve-bowman

PhD-position

The University of Twente offers following position:

PhD position: Global projections of land motion and associated coastal flooding

Deadline	Location
30 June 2021	Enschede

JOB DESCRIPTION

The coastal zone is one of the highest density population areas in the world, with about 40% of the global population living within 100 km of the coast in the present, which is expected to grow further over the 21st century. The low elevation coastal zone is very vulnerable to sea level rise (SLR) and is especially under great threat of coastal flooding. Several recent studies have shown that climate change will result in an increase in the frequency of episodic flooding. The asset value at risk from coastal flooding globally is estimated to be up to $14.2 trillion by the end of the century under RCP 8.5. Therefore, robust projections of future coastal flooding are essential for risk reduction and effective adaptation. However, up to date, future coastal flooding, especially at regional and global scales, has been estimated based on projections of extreme water levels. The potentially very important component of vertical land motion (VLM) is often neglected in estimating coastal flooding. It has been shown that the land subsidence rates at some locations are much larger compared to the sea level rise itself. Thus, incorporating the land motion component in coastal flooding assessments is very important. This PhD project aims to produce the global data base of vertical land motion and the associated projections of coastal flooding.

REQUIREMENTS

You have BSc and MSc degree in Civil Engineering, Applied Mathematics, Earth Observation or a related discipline.

You have knowledge or strong affinity with coastal/ocean systems.

You have sound programming skills for data analysis, numerical modelling (e.g Python, Matlab, other).

You have experience with satellite remote sensing/earth observation and image processing; with handling big (global) data sets.

You have good organizational skills. You are enthusiastic, independent and have a problem solving attitude.

You are willing to contribute to teaching in the Civil Engineering educational program and to supervise graduate students.

You have good communication and writing skills (in English (IELTS >= 6.5 or equivalent), preferably also in Dutch). It's nice if you have written scientific papers.

CONDITIONS OF EMPLOYMENT

The UT provides a dynamic and international environment, combining the benefits of academic research with a topic of high industrial relevance, excellent working conditions, an exciting scientific environment, and a green and lively campus. We offer:

A full-time 4-year PhD position;

Excellent mentorship in a stimulating research environment with excellent facilities;

An offer for a personal development program within the Twente Graduate School;

A gross monthly salary of € 2.395 in the first year, increasing each year up to € 3.061 in the fourth year;

A holiday allowance of 8% of the gross annual salary, and a year-end bonus of 8.3%;

A minimum of 29 holidays per year in case of full-time employment.

https://www.academictransfer.com/en/300761/phd-position-global-projections-of-land-motion-and-associated-coastal-flooding/

Special Issue 'Water'

Announcement of a special issue of 'Water': A special issue of Water (ISSN 2073-4441). This special issue belongs to the section "Hydrology and Hydrogeology".

Deadline for manuscript submissions: 30 March 2022.

Keywords

groundwater quality

groundwater vulnerability

anthropogenic/geogenic contamination

land subsidence

risk analysis and assessment

machine learning

deep learning

statistical method

climate change

land use

https://www.mdpi.com/journal/water/special_issues/vulnerability_groundwater

Presentations

India, Mumbai

Youtube Presentation 2.15 hours:

Dutch Answers to Flood Management and Land Subsidence

https://www.youtube.com/watch?v=zXvw_lmO7Qs&ab_channel=SmartWater%26WasteWorld

Iran

ID 509 Analysis of Faryab Zone Subsidence by Radar Interferometry Technique (3 minutes presentation)

https://www.youtube.com/watch?v=uIY0KQFzuxk&ab_channel=EOOpenScience

PR China, Tianjin

Current Land Subsidence in Tianjin, China Derived from Sentinel-1A/1B Synthetic Aperture Radar data and GPS data (2014—2019)

By: Xiao Ju: Department of Earth and Atmospheric Sciences

https://www.youtube.com/watch?v=-C40yyBWeMg&ab_channel=EOOpenScience

(5 minutes)

Romania, Bucharest

A 10 minute presentation: Poenaru &all Sentinel 1 for Monitoring Land Subsidence of the Bucharest with PSinSAR Technique

https://www.youtube.com/watch?v=FnDPd1Ql5YI&ab_channel=EOOpenScience