



Newsletter of the Unesco Land Subsidence International Initiative

Vol.8 November 2020

We mentioned already in the 7th issue an important publication in Nature, co-authored by our former chair Devin Galloway. Devin was so kind to send us a short summary:

A recent study (<https://rdcu.be/b8O0y>) co-authored by Devin L. Galloway shows that at tide gauge Galveston Pier 21 in Texas, USA subsidence attributed to aquifer-system compaction accompanying regional groundwater extraction in the Houston-Galveston area contributed as much as 85% of the 0.7 m relative sea level rise since 1909. The study projects an additional 1.9 m of relative sea level rise at the tide gauge by 2100, with contributions from land subsidence declining from 30 to 10% over the projection interval.

Relative sea level rise at tide gauge Galveston Pier 21, is the combination of absolute sea level rise and land subsidence. The study estimates a uniform absolute sea level rise rate of $1.10 \text{ mm} \pm 0.19/\text{a}$ in the Gulf of Mexico during 1909–1992, and since 1992 absolute sea level is accelerating $0.270 \text{ mm}/\text{a}^2$ at the tide gauge. This acceleration is 87% of that estimated for the highest scenario of global mean sea level rise. Study results indicate projections of relative sea level rise that use the estimated highest scenario of global mean sea level and local coastal subsidence estimates would be appropriate for formulating resource-management and flood-hazard-mitigation strategies for coastal communities in the Gulf of Mexico.



Tide gauge Galveston Pier 21. Photo credit: U.S. National Oceanic and Atmospheric Administration (NOAA).

Special Issue Remote Sensing

With a deadline for contributions on September 1st, 2021:

Special Issue “Application of Remote Sensing in Hydrogeology: Landslides, Land Subsidence and Uplift”

3 November 2020

The Special Issue of Remote Sensing journal on “Application of Remote Sensing in Hydrogeology: Landslides, Land Subsidence and Uplift” (deadline: 1 September 2021) – Guest Editors: Francesca Ardizzone (CNR-IRPI, Italy) – is still opened.

The goal of this Special Issue of Remote Sensing (Section Remote Sensing in Geology, Geomorphology, and Hydrology) is to gather original research or case studies exploiting remote sensing techniques for detecting, characterizing, and modelling landslides, land subsidence, and uplift due to groundwater level changes.

For information: francesca.ardizzone@irpi.cnr.it

Link: https://www.mdpi.com/journal/remotesensing/special_issues/Landslides_Land_Subsidence_Uplift

Vacancy for a PhD-position in the Netherlands

PhD position 'social cost-benefit analysis of land subsidence, its management and governance'

Published on
November 30, 2020

Location Wageningen

Respond [Click here to respond](#)

We are looking for

*Land subsidence is a challenge for the Netherlands but also globally. How can it be mitigated and managed? Information and valuation of costs and benefits are key to these questions. Within the framework of the joint NWA-ORC programme “**Living on Soft Soils: Subsidence & Society (LOSS)**” of Utrecht University, TUDelft, Wageningen University and Research, Deltares Research Institute, TNO, and Wageningen Environmental Research, Wageningen University is seeking a motivated PhD candidate to work on this collaborative research programme.*

The threat of land subsidence asks for an integrated research programme that addresses the

issue of land subsidence in a holistic way: insights about how physical-chemical-biological systems in soils function feed into evaluation and assessment of management and governance measures. The overall aim of the programme is to develop an integrative approach to achieve feasible, legitimate and sustainable solutions for managing the negative societal effects of land subsidence, connecting fundamental research on subsidence processes to socio-economic impact of subsidence and to governance and legal framework design.

The challenge of this PhD project is to bring together the sector-specific agricultural (rural) perspective with the civil engineering perspective mostly focusing on urban areas to get to a comprehensive impact assessment of land subsidence. The project aims to develop decision support tools that reflect uncertainties and knowledge gaps on the one hand and risk aversion of stakeholders on the other hand. The PhD candidate will conduct a comprehensive Social Cost Benefit Analysis (SCBA) that maps out damages in low-lying and subsiding areas, increasing flood risks, and impacts on nature conservation. The SCBA is extended to policy alternatives such as water level adjustment, construction improvements for buildings, changing land use but also institutional design alternatives such as taxes or compensatory payments.

You will work at the [Environmental Economics and Natural Resources](#) Group of Wageningen University in close collaboration with our academic and societal partners. The disciplinary breadth of the project asks for considerable flexibility regarding the methods to be used (e.g. economic valuation methods, spatial and agent-based modelling).

We ask

We are looking for an enthusiastic, curious, and creative candidate who has preferably:

- an MSc degree in economics, environmental sciences or a related field;
- a background in modelling and numerical methods; programming skills (Python, R, Matlab or any related language) are an advantage;
- previous experience with one of the following: economic valuation, cost-benefit analysis, spatial modelling, econometrics, agent-based models or related tools;
- a keen interest to work in an interdisciplinary team; prior knowledge on governance of Dutch water systems; decision-making under uncertainty, are an advantage;
- fluency in spoken and written English, Dutch language skills are an advantage;
- excellent organisational, communicating and connecting skills: you will collaborate with scientists from various disciplines as well as with stakeholders.

You also have to meet all the entry requirements of the [WUR PhD programme](#).

<https://www.wur.nl/en/vacancy/PhD-position-social-cost-benefit-analysis-of-land-subsidence-its-management-and-governance.htm>

General: Safety-project

Our member Gerardo Herrera was co-author of following:

SAFETY PROJECT: SENTINEL-1 BASED TOOLS FOR GEOHAZARDS MONITORING AND MANAGEMENT

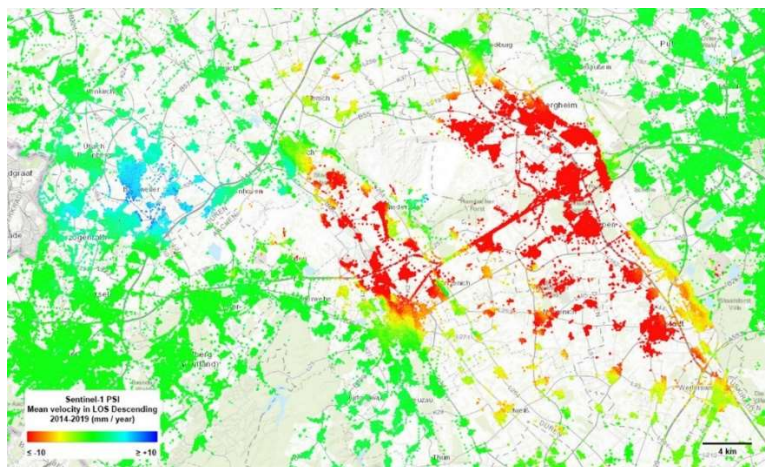
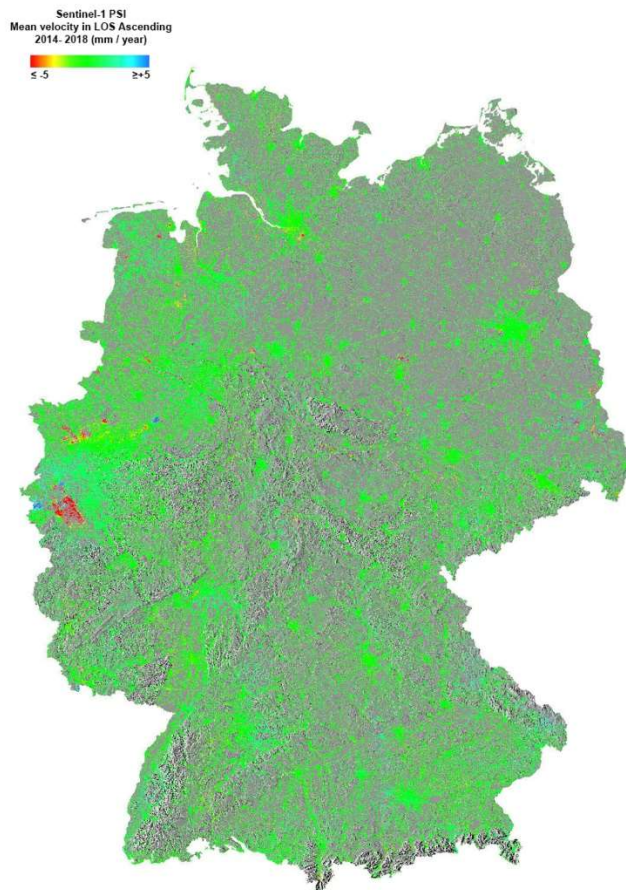
<https://www.researchgate.net/publication/345641172> SAFETY PROJECT SENTINEL-1 BASED TOOLS FOR GEOHAZARDS MONITORING AND MANAGEMENT

Germany

New: mapping of land subsidence in Germany.

https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Sentinel-1/Germany_land_motion_mapped

Look here for two examples.



Indonesia,

Johan C. Winterwerp et al.,

Managing erosion of mangrove-mud coasts with permeable dams – lessons learned,

Ecological Engineering, Volume 158, 2020, 106078, ISSN 0925-8574,

<https://doi.org/10.1016/j.ecoleng.2020.106078>

See also: <https://www.wetlands.org/news/indonesia-builds-on-building-with-nature-experience-to-accelerate-climate-adaptation/>

PR China, Wuhan

Han, Y.; Zou, J.; Lu, Z.; Qu, F.; Kang, Y.; Li, J. Ground Deformation of Wuhan, China, Revealed by Multi-Temporal InSAR Analysis. *Remote Sens.* **2020**, *12*, 3788.

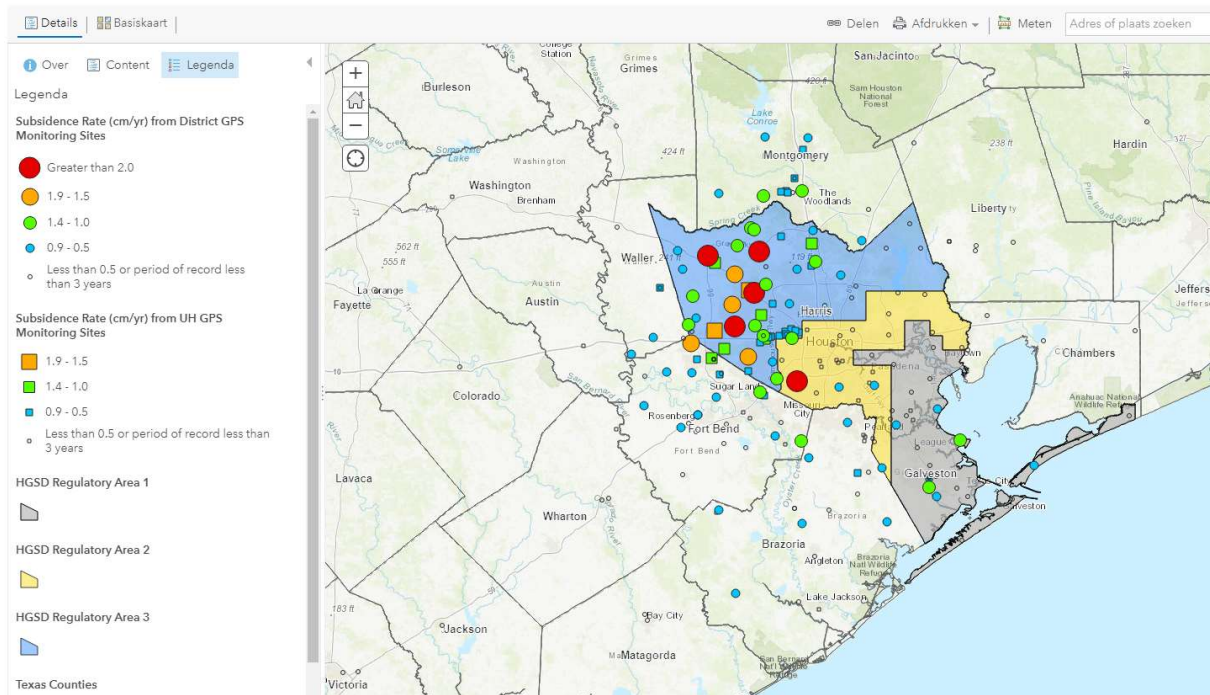
<https://www.mdpi.com/2072-4292/12/22/3788>

USA, Texas

An interactive map of subsidence rates in the Harris-Galveston District is published:

<https://hgsubsidence.org/science-research/subsidence-measurement/>

ArcGIS ▾ Subsidence Rates in Harris and Surrounding Counties, 2015-2019



New Literature

Cambodja, Angkor Wat

Kumar, S., Vignesh, S.K., Babu, A. *et al.* PSInSAR-Based Surface Deformation Mapping of Angkor Wat Cultural Heritage Site. *J Indian Soc Remote Sens* (2020).

<https://doi.org/10.1007/s12524-020-01257-7>

Indonesia, Jakarta

Hakim, W.L.; Achmad, A.R.; Lee, C.-W. Land Subsidence Susceptibility Mapping in Jakarta Using Functional and Meta-Ensemble Machine Learning Algorithm Based on Time-Series InSAR Data. *Remote Sens.* **2020**, *12*, 3627.

Italy, Firenze-Prato-Pistoia Region

Ceccatelli, M., Del Soldato, M., Solari, L. *et al.* Numerical modelling of land subsidence related to groundwater withdrawal in the Firenze-Prato-Pistoia basin (central Italy). *Hydrogeol J* (2020). <https://doi.org/10.1007/s10040-020-02255-2>

Mexico City, Villahermosa, Tabasco

A book by Zenia Pérez-Falls and Guillermo Martínez-Flores: Land Subsidence in Villahermosa Tabasco Mexico, Using Radar Interferometry.

<https://www.springerprofessional.de/land-subsidence-in-villahermosa-tabasco-mexico-using-radar-inter/18629958>

PR China, General, pipelines

Sixi Zha et al., in ASME, Digital collection:

Quantitative Assessment of Damage in Buried Polyethylene Pipe Subjected to Land Subsidence

<https://doi.org/10.1115/1.4049047>

PR China, Xi'an

Wei Chi et al., Spatial-Temporal Evolution of Land Subsidence and Rebound over Xi'an in Western China Revealed by SBAS-InSAR Analysis

<https://www.mdpi.com/2072-4292/12/22/3756/pdf>

PR China, Yellow River Delta

Guoyang Wang et al., Coastal Dam Inundation Assessment for the Yellow River Delta: Measurements, Analysis and Scenario

Remote Sens. **2020**, *12*(21), 3658; <https://doi.org/10.3390/rs12213658> (registering DOI)

USA, Arizona

Sayantan Majumdar et al.,

Integrating Remote Sensing and Machine Learning for Groundwater Withdrawal Estimation in Arizona

<https://www.essoar.org/doi/10.1002/essoar.10504981.1>

From the Press

Indonesia, Jakarta

Water efficiency as an immediate mitigation tool against Jakarta sinking process:

<https://www.gwp.org/en/waterchangemakers/change-stories/565177/>

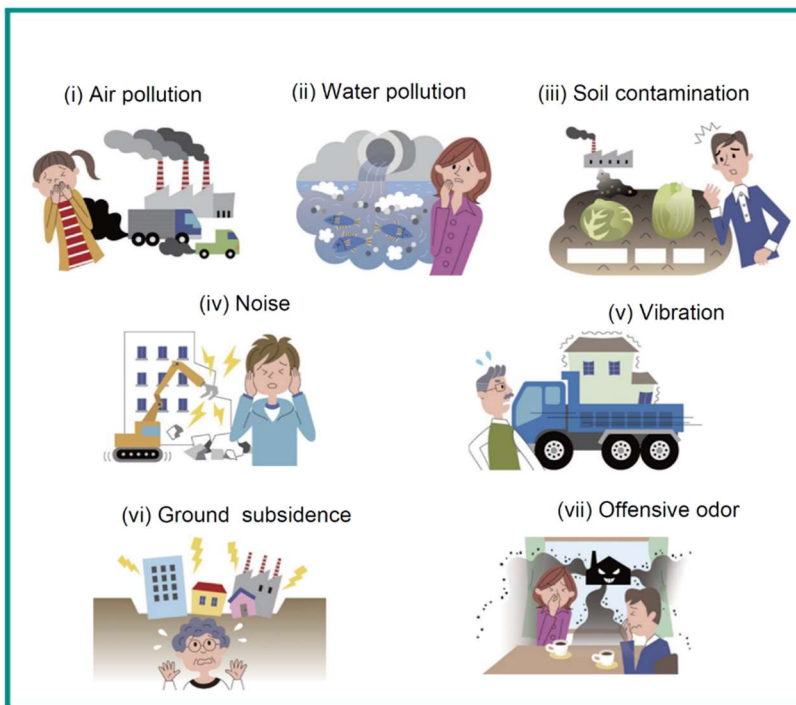
And a youtube film about water management in Indonesia and Vietnam in the battle against subsidence (6 minutes) by Jun Ichi Aoki.

https://www.youtube.com/watch?v=qm6hhuFUtTw&ab_channel=jetroglobalchannel

Japan

The environmental Coordination Commission has defined seven major types of pollution:

One of them is Land Subsidence.

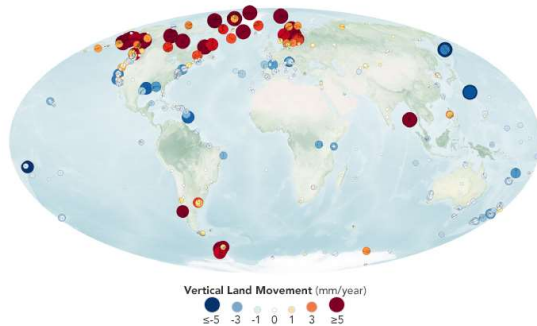


<https://www.soumu.go.jp/kouchoi/english/definition.html>

NASA

Taking a Measure of Sea Level Rise: Land Motion

<https://earthobservatory.nasa.gov/images/147436/taking-a-measure-of-sea-level-rise-land-motion>



United States, Annapolis

WASHINGTON- Naval Facilities Engineering Command (NAVFAC) Washington recently awarded a contract to Swift River Versar JV to develop a comprehensive plan to reduce the effects of land subsidence, sea-level rise, groundwater change, coastal flooding/storm surge, and inadequate stormwater management at Naval Support Activity Annapolis (NSAA) and the United States Naval Academy (USNA).

<https://www.navy.mil/Press-Office/News-Stories/Article/2409268/planning-is-key-to-resiliency-at-naval-support-activity-annapolis-naval-academy/>

United States, California

Starring Michelle Sneed in a 1.45 minutes movie:

<https://eu.palmbeachpost.com/videos/embed/77028670>

Also in California: Levee Project Proposed for Santa Venetia, *Improved system intended to mitigate tidal flooding*

<https://www.marincounty.org/main/county-press-releases/press-releases/2020/dpw-santavenetia-111320>

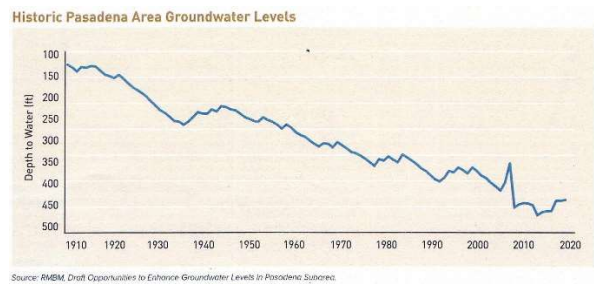
United States, California, Fresno

Private well owners can shape state's water decisions

<https://www.fresnobee.com/fresnoland/article247462900.html>

United States, California, Raymond Basin

The Raymond Basin Groundwater Crisis:



<https://www.arroyoseco.org/groundwater.htm>

Vietnam, Ho Chi Minh City

HCM City has drawn up 56 projects and plans to adapt to climate change. — VNS Photo Ngọc Diệp

<https://www.mdpi.com/2072-4292/12/22/3788>

