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UNESCO Land Subsidence
International Initiative

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Call for Papers

https://www.frontiersin.org/research-topics/36051/climate-change-and-coastal-areas

About this Research Topic

Coastal areas face high risk from rising relative sea-levels that threaten the health of coastal wetlands, adversely affect urbanization, infrastructure, economic activities, and increase flood risks to coastal communities. Coastal wetlands provide protection during storm surge events by providing resistance to the flow of water and therefore, reduce wave energy and inland flooding. However, coastal wetlands are being impacted by both anthropogenic and natural disturbances. Over the past~100 years, coastal states lost tens of thousands of square miles of land caused by climate change and sea-level rise. In many places, rates of global sea level rise are exceeded by present rates of subsidence. Both the loss of coastal wetlands and subsidence expected to increase the intensity of flooding, changes in exposures of flooded areas, and expedites the deterioration of infrastructure in coastal areas.

The new and emerging technologies of satellites, air-borne, Drone imagery and LiDAR scanning provide an opportunity to better quantify coastal wetland change, both areal extent of land loss/gain and vegetation community structure, associated with natural and anthropogenic stressors. It is the goal of this Research Topic to encourage original scientific contributions focusing on using the new and emerging technologies of spaceborne and airborne multispectral, hyperspectral, SAR and LiDAR, GIS-based mapping, spatial analysis, artificial neural networks, machine learning, and web-based applications for quantifying coastal erosion rates, the role of natural, natural-based features and restoration strategies for reducing inundation and vulnerability of coastal areas under climate change and different sea-level rise scenarios.

Original research articles, review articles, methods and perspectives are welcome to this Research Topics. We look forward to receiving original and inspiring contributions focusing on:

• Assessment of climate change driven physical impacts on coastal areas;

• Projections of SLR, storm surge, and waves driven variations in coasts;

- Quantifying economic and/or environmental risk in coastal zones;
- Assessment of the impacts of natural features and restoration strategies for reducing inundation and vulnerability of coastal areas.

Keywords: climate change, sea-level rise, remote sensing, GIS, wetlands, coastal areas

Important Note: All contributions to this Research Topic must be within the scope of the section and journal to which they are submitted, as defined in their mission statements. Frontiers reserves the right to guide an out-of-scope manuscript to a more suitable section or journal at any stage of peer review.

New Literature

Coastal Cities

Pei-Chin Wu et al., Gophysical Research Letters.

Subsidence in coastal cities throughout the world observed by InSAR

https://doi.org/10.1029/2022GL098477

Egypt, Nile Delta

Abd-Elhamid, H.F. et al., Assessment of Changing the Abstraction and Recharge Rates on the Land Subsidence in the Nile Delta, Egypt. Water 2022, 14, 1096.

https://doi.org/10.3390/ w14071096

https://www.mdpi.com/2073-4441/14/7/1096/pdf

Pakistan, Karachi

Hussain, M.A., Chen, Z., Shoaib, M. et al. Sentinel-1A for monitoring land subsidence of coastal city of Pakistan using Persistent Scatterers In-SAR technique. Sci Rep 12, 5294 (2022). https://doi.org/10.1038/s41598-022-09359-7

PR China, Suzhou City

Lu, Y., Chen, D. & Chen, Y. Analysis of Spatiotemporal Land Subsidence Patterns of Suzhou City, China, over the Past 15 years Based on Multisource SAR Data. J Indian Soc Remote Sens (2022). https://doi.org/10.1007/s12524-022-01508-9

PR China, Tianjin

Hairuo Yu et al., Analysis of superposition effect of land subsidence and sea level rise in Tianjin coastal area and its emerging risks

https://www.authorea.com/doi/full/10.22541/au.164753992.25635868/v1

Mining

Yaran Yu et al., A Lightweight Anchor-Free Subsidence Basin Detection Model With Adaptive Sample Assignment in Interferometric Synthetic Aperture Radar Interferogram.

https://www.frontiersin.org/articles/10.3389/fevo.2022.840464/full

Khazachstan, Tengiz Oil Reservoir

Emil Bayramov et al.,

Multi-Temporal SAR Interferometry for Vertical Displacement Monitoring from Space of Tengiz Oil Reservoir Using SENTINEL-1 and COSMO-SKYMED Satellite Missions

https://www.frontiersin.org/articles/10.3389/fenvs.2022.783351/full

the Netherlands, Groningen Gasfield

Thibault Candela et al.,

Subsidence Induced by Gas Extraction: A Data Assimilation Framework to Constrain the Driving Rock Compaction Process at Depth

https://www.frontiersin.org/articles/10.3389/feart.2022.713273/full

PR China, Daliuta Coal Mine

Guangchun Liu et al.,

Characteristics of Overburden and Ground Failure in Mining of Shallow Buried Thick Coal Seams under Thick Aeolian Sand

https://www.mdpi.com/2071-1050/14/7/4028/pdf

PR China, Ningtiaota coal mine

Zhao, B. et al., Prediction Method for Surface Subsidence of Coal Seam Mining in Loess Donga Based on the Probability Integration Model.

https://doi.org/10.3390/en15062282

PR China

Yanjun Zhang et al., "Relationship between Surface Subsidence Range and Geological Mining Conditions Using Numerical Simulation and Machine Learning", Scientific Programming, vol. 2022, Article ID 8720831, 12 pages, 2022. https://doi.org/10.1155/2022/8720831

PR China, Xu Huaifu Expressway

Wenbin Tao, Luxin Dai, Zhifeng Zhang, Bin Tang, Lin Yu, "Stability Analysis Model of Expressway Passing through Goaf Based on SBAS-InSAR Technology", Mathematical Problems in Engineering, vol. 2022, Article ID 7006464, 13 pages, 2022. https://doi.org/10.1155/2022/7006464

https://www.hindawi.com/journals/mpe/2022/7006464/

Modelling

Numerical Model (Modflow)

Documentation on Modflow Package 6 (Skeletal Storage, Compaction and Subsidence)

Hughes, J.D., Leake, S.A., Galloway, D.L., and White, J.T., 2022, Documentation for the Skeletal Storage, Compaction, and Subsidence (CSUB) Package of MODFLOW 6: U.S. Geological Survey Techniques and Methods, book 6, chap. A62, 57 p., https://doi.org/10.3133/tm6A62.

Analytical Model

Su, X., and Mehrabian, A. (March 4, 2022). "The Viscoelastic Solution to Geertsma's Subsidence Problem." ASME. J. Appl. Mech. May 2022; 89(5): 051009. https://doi.org/10.1115/1.4053790

Probabilistic

Deng, S., Yang, H., Chen, X. et al. Probabilistic analysis of land subsidence due to pumping by Biot poroelasticity and random field theory. J. Eng. Appl. Sci. 69, 18 (2022). https://doi.org/10.1186/s44147-021-00066-0

Foundations

Chengwei Yang, Zhenzhen Jiang, "A Discrete-Time Model-Based Method for Predicting Settlement of Geotechnical Foundations in Buildings", Mobile Information Systems, vol. 2022, Article ID 5631634, 7 pages, 2022. https://doi.org/10.1155/2022/5631634

https://www.hindawi.com/journals/misy/2022/5631634/

From the Press

India, Delhi

Delhi, sinking?

https://www.indiawaterportal.org/articles/delhi-sinking

Iran

Measuring Groundwater-Induced Land Subsidence in Iran

https://www.cmes.lu.se/article/measuring-groundwater-induced-land-subsidence-iran

the Netherlands

The Dutch built cities on sinking land: how will this fare with climate change?

https://dutchreview.com/culture/society/how-the-dutch-built-cities-on-sinking-land/

USA, California

New data shows subsidence continues in Water Year 2021, but pace is slower

Posted on March 3, 2022 by Valley Voice Contributor

https://www.ourvalleyvoice.com/2022/03/03/new-data-shows-subsidence-continues-in-water-year-2021-but-pace-is-slower/