

Assessing critical infrastructure exposure to Sea Level Rise and land subsidence under climate change: the cases of Venice and Fiumicino airports and Marghera harbor (Italy)

Summary

Climate change-induced sea level rise threatens coastal infrastructures, particularly in densely populated and economically significant regions such as the Mediterranean. This study examines the exposure of three Italian coastal areas where ports, airports, buildings, tourist infrastructures, and communication networks are exposed to sea level rise. We focus on the major international airports of Venice Marco Polo and Rome Fiumicino Leonardo Da Vinci, located close to sea level, and the important commercial harbor of Porto Marghera, near Venice. These hubs are essential for global connectivity and economy but are becoming increasingly vulnerable to coastal flooding, storm surges, and extreme weather events due to ongoing global warming.

Using recent projections from the Intergovernmental Panel on Climate Change and high-resolution Digital Elevation Models, we assess the potential inundation risks up to 2150 AD under different sea level rise scenarios, considering the high-emission Shared Socioeconomic Pathway SSP5-8.5. By analyzing these critical transport nodes' projected impacts and adaptive capacity, we highlight the urgent need for coordinated action to mitigate climate risks in Mediterranean coastal zones. Our study underscores the importance of integrating climate resilience into long-term infrastructure planning to safeguard people, economy, social stability, and environmental areas in the investigated region.



RSLR scenario for the Venice Airport with the expected extension of flooding in 2050, 2100, and 2150 for the SSP5-8.5 scenario.

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