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Risk assessment for tsunami events in the city of Siracusa, Italy

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Siracusa is an important historical city of Greek origin, located on the southern part of the eastern coast of Sicily. The old town developed on the island of Ortigia, and expanded on the near mainland, but later it declined and during the Middle Ages it occupied only the island. The development of the built areas on the mainland restarted at the end of the nineteenth century, with the construction of a number of new quarters. Nowadays the island of Ortigia is connected to the rest of the town by two drive-over bridges. The history of Siracusa as well as of the eastern coast of Sicily is marked by destructive earthquake events that caused significant damage and many fatalities, and also by lethal tsunamis (occurred in the years 1169, 1693 and 1908). Indeed, this region is one of the coastal areas most prone to tsunami attacks in the Mediterranean Sea, being affected by local-source tsunamis and also by those generated by earthquakes in the Western Hellenic Arc.

For these reasons, in the last decade the need has developed to prepare adequate evacuation measures to respond to tsunami hazardous events. This work, using the method proposed by Pagnoni et al. (2020) and applied to the near town of Augusta, studies the tsunami risk for different inundation levels. The results are provided in terms of the Human Damage (HD), which is the number of people involved and the number of fatalities, and of the Economic Loss (EL), which returns the loss of economic value of buildings affected by tsunamis. Maps of HD and EL per each inundation scenario allow one to understand which areas of Siracusa are most involved and also to identify evacuation paths to potential safe collection areas and/or buildings for efficient emergency plans.