



Coastal disasters in Asia: Forecasting, Uncovering, Recovering, and Mitigation

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With 60% of the world's population, low-lying deltas, numerous islands, long coastlines, rapid population growth, and economic development, the Asian coast is the most vulnerable area in the world to disasters. No other part of the world has such a large number of subduction plate boundaries and warm ocean basins, resulting in massive tsunamis, tropical cyclones, and storm surges (Figure 1). In reality, the six worst coastal disasters of the 21st century in terms of number of casualties all occurred in Asia: the Indian Ocean Tsunami (2004), Cyclone Sidr (Bangladesh, 2007), Cyclone Nargis (Myanmar, 2008), the Great East Japan Earthquake and Tsunami (Japan, 2011), Typhoon Haiyan (the Philippines, 2013), and the Sulawesi (Palu) Earthquake, Landslide and Tsunami (Indonesia, 2018). These six disasters have claimed more than 400,000 victims.

Natural and anthropogenic environmental degradation, such as coastal erosion, land subsidence, and mangrove deforestation, have also been remarkably increasing the risk of disasters in Asia (Hao and Takewaka 2022; Sreeranga et al. 2022). Locally-intensified tsunamis due to a combination of earthquakes, volcanic eruptions, subaerial and submarine

landslides (Heidarzadeh and Mulia 2022; Sabeti and Heidarzadeh 2022) and risks associated with the uncertainty of large thrust earthquakes also need to be further studied and clarified (Momeni et al. 2022). Where major disasters occurred in Asia, recovery has immediately begun with international support, but the mid- and long-term successes of such recovery efforts are not straightforward (Luchi et al. 2023). In countries with sufficient financial resources, the immediate recovery steps will be to strengthen through, for example, coastal dikes and embankments. However, not many areas in Asia can take into action appropriate hard countermeasures such as construction of coastal dikes due to financial constraints (Takagi et al., 2022).

Asia has countless examples of disasters, which, on the other hand, means that there is ample evidence on the ground that can be used to enhance scientific understanding (Valdez et al. 2022; Heidarzadeh and Mulia 2022). Limited funds and resources also mean that there are opportunities for innovation in various disaster mitigation measures (Pringgana, Cunningham, and Rogers 2023). In fact, several Asian countries have successfully implemented mass evacuations of

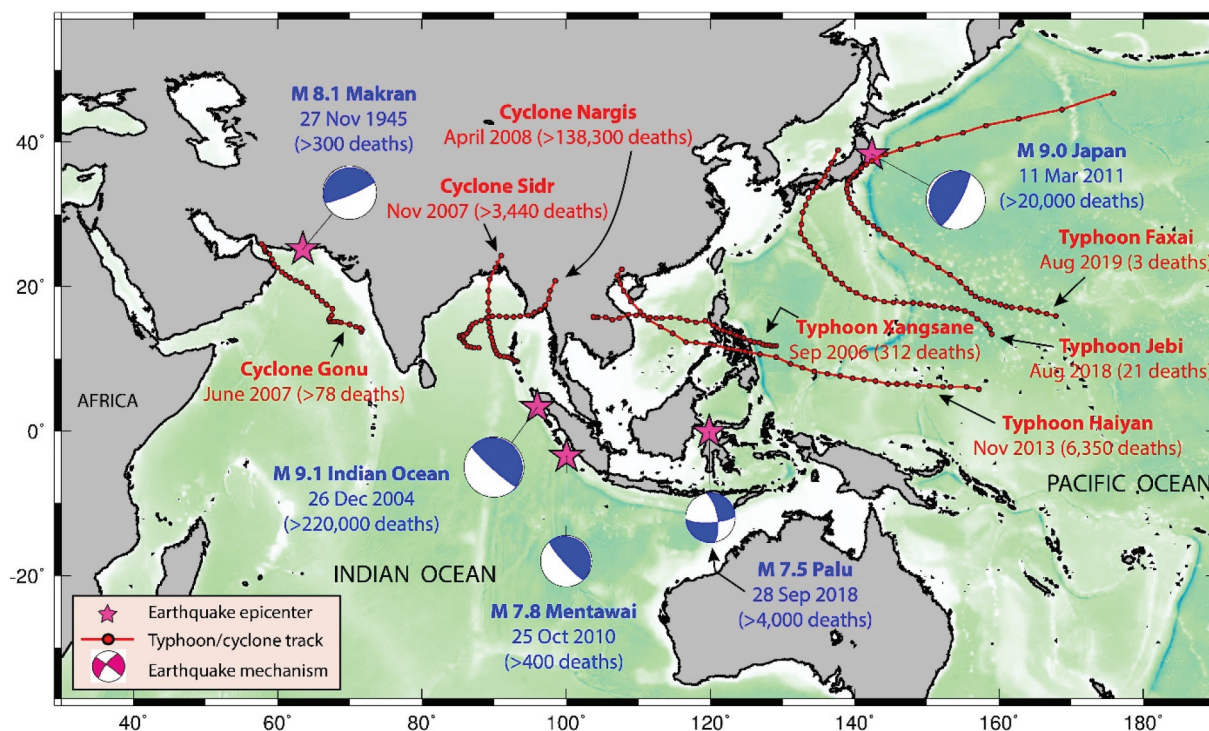


Figure 1. Some of the major coastal disasters in Asia, which resulted in significant destruction and casualties.

residents during approaching tropical cyclones, led by volunteers or local governments (Takagi et al. 2022). The rich natural environment nurtured by Asia's tropical and subtropical climates may also become an asset for improving disaster prevention infrastructure, depending on its utilization (Sreeranga et al. 2022).

In this special issue of *Coastal Engineering Journal*, entitled "Coastal Disasters in Asia: Forecasting, Uncovering, Recovering, and Mitigation," a total of 9 rigorously peer-reviewed papers have been published, covering various perspectives on coastal disasters in Asia. We hope that this special issue will arouse readers' interest in the issue of coastal disasters in Asia and help to make some progress in disaster reduction efforts. Last but not least, we would like to thank the Editor-in-Chiefs, Yusuke Uchiyama and Keiko Udo, and many anonymous reviewers for their valuable advice, coordination and prompt reviews from the beginning to the end of the course of this special issue.

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