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A first estimation of Tsunami Hazard of the Caribbean Coast of Costa Rica from Local and Distant Seismogenic Sources

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Costa Rica has experienced 41 tsunamis since 1746, 36 of them at the Pacific coast and only 5 at the Caribbean coast. However, the oldest record belongs to the Caribbean coast, as well as the only tsunami that has caused deaths in Costa Rica: the 1991 Limón tsunami. For Costa Rica, the historical, geophysical, geological, and geodetic information required to characterize the tsunami threat is scarcer at the Caribbean coast than at the Pacific coast. However, a 2021 study generated 10 worst-case-scenario tsunami sources at Costa Rica Caribbean coast (Zamora et al., 2021). Also, IOC-UNESCO has conducted four Experts Meeting on Tsunami Sources for subregions of the Caribbean Sea leading to the definition of worst-case-scenario tsunami sources. Here, we model the tsunami inundation caused by all those seismic scenarios for three locations in Costa Rica using ComMIT and include several scenarios based in pre-calculated unit sources. We found that the flow depths and extent of inundation areas are smaller at those locations than those obtained for the Pacific coast. However, the arrival times are also much smaller than those at the Pacific coast, in some cases of less than 5 min. Consequently, the tsunami readiness for the Caribbean coast of Costa Rica should consider these parameters and focus on community preparedness. This study is considered a first estimation as other tsunami sources such as landslides and volcanic eruptions are not considered.

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