A Semi-Spectral Approach for the Mathematical Modelling for the Underwater Landslide Tsunami Scenarios in the Sea of Marmara

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The landslide tsumamis have been an active area of research during the last decade. Alongside the purely numerical models and the laboratory experiments, there have been efforts with analytical techniques to better understand the nature of the gravity waves created by submarine mass failures. In this work, we present the results obtained using a new semi-spectral technique that we developed at Istanbul Technical University. The Sea of Marmara presents an interesting setting for the landslide tsunami problem. There have been large-scale submarine mass failures in the past and given the present tectonic setting, the risk of submarine landslides on the flanks of the deep basins where the slope reaches , at places, to 29 degrees can not be ruled out. The best documented submarine mass failure is a slump-like event that occurred around 17000 years ago on the northern slope that bounds the Cinarcik Basin. The scar area that corresponds to this event is around 32.5 km^2. We do our simulations without making a shallow-water assumption and we find that on a characteristic slope bounding the Cinarcik Basin when the width of the sliding mass reaches around 5 km, the maximum wave height reaches 0.65 times the thickness of the sliding mass.