A Preliminary Tsunami vulnerability analysis for Bakirkoy district in Istanbul

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Resilience of coastal utilities after earthquakes and tsunamis has major importance for efficient and proper rescue and recovery operations soon after the disasters. Vulnerability assessment of coastal areas under extreme events has major importance for preparedness and development of mitigation strategies. The Sea of Marmara has experienced numerous earthquakes as well as associated tsunamis. There are variety of coastal facilities such as ports, small craft harbors, and terminals for maritime transportation, water front roads and business centers mainly at North Coast of Marmara Sea in megacity Istanbul. A detailed vulnerability analysis for Yenikapi region and a detailed resilience analysis for Haydarpasa port in Istanbul have been studied in previously by Cankaya et al., (2015) and Aytore et al., (2015) in SATREPS project.

In this study, the methodology of vulnerability analysis under tsunami attack given in Cankaya et al., (2015) is modified and applied to Bakirkoy district of Istanbul. Bakirkoy district is located at western part of Istanbul and faces to the North Coast of Marmara Sea from 28.77oE to 28.89oE. High resolution spatial dataset of Istanbul Metropolitan Municipality (IMM) is used and analyzed. The bathymetry and topography database and the spatial dataset containing all buildings/structures/infrastructures in the district are collated and utilized for tsunami numerical modeling and following vulnerability analysis. The tsunami parameters from deterministically defined worst case scenarios are computed from the simulations using tsunami numerical model NAMI DANCE. The vulnerability assessment parameters in the district according to vulnerability and resilience are defined; and scored by implementation of a GIS based TVA with appropriate MCDA methods. The risk level is computed using tsunami intensity (level of flow depth from simulations) and TVA results at every location in Bakirkoy district. The preliminary results are presented and discussed.