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Post-Earthquake Rapid Loss Estimation for the October 23, 2011 Van Earthquake

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Extensive work has been done over the last decades regarding the development applications for earthquake rapid response systems that serve to estimates the earthquake losses in quasi-real time after an earthquake. Currently operating near-real-time loss estimation tools can be classified as global, local and facility-specific systems depending on the size of area they cover. For the global or regional near-real-time loss estimation systems: GDACS, WAPMERR, PAGER, and NERIES-ELER methodologies are presented together with their loss estimations for the October 23, 2011 Van earthquake. The Mw7.2 earthquake in Eastern Turkey on Sunday 23.10.2011, 13:41 local time hit the Eastern Turkey causing around extensive damage and casualties. Following the first determination of the earthquake parameters, Kandilli Observatory and Earthquake Research Institute (KOERI) broadcasted initial estimates of intensity distribution, building damage and casualties using the ELER© software. The estimations found general acclaim as the real damage and casualty figures of the earthquake became available. The factors leading to the successful estimations of damages and casualties were the correct determination of the epicentral location, the use of ground motions prediction models that best fit the strong ground motion data in Turkey, and the use of geo-coded building and population inventories. Due to the proximity of the earthquake epicenter to one of the major cities in the region, rapid damage estimations were highly sensitive to correct determination of magnitude and hypocentral coordinates. The degree of these sensitivities was assessed with tests based on perturbation on magnitude and hypocentral location of the earthquake.