# Geodetic benchmark displacement measurements following the 2020 Petrinja earthquake in Croatia

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The earthquake with magnitude ML=6.2 that occurred on 29th December 2020 has caused significant material damage to objects and infrastructure in the towns of Petrinja, Sisak,Glina and the surrounding area. According to the satellite interferometry data, the coseismic and postseismic deformation area covers around 500 square kilometers. The existing geodetic benchmarks have been set in the affected towns, and their coordinates have been determined based on previous GPS campaigns. The GPS network was set up and adjusted at the State Geodetic Administration's request for geodetic monitoring of infrastructure and cadastral projects. These points are not primarily intended for high accuracy measurements at the level of a few millimeters, so their accuracy and the absolute shift concerning geodynamic processes in the region should be taken into account. Nevertheless, the data obtained by their observation after the earthquake can provide valuable information about the horizontal and vertical displacements with a certain level of confidence. The field survey has detected disappearance of a large number of benchmarks and some valuable information has been lost. Still, 58 points were found and observed and it has been concluded that 52 points are reliable and can be used for future research. Because the network of benchmarks is not developed in rural areas, there is a gap in the distribution of benchmarks in affected area. Therefore, the additional data was collected using the benchmarks established for the engineering and cadastral projects and studies. From a total of 67 points that have been found and observed, 42 points will be used. Along with the data collected in

urban areas, there will be a total of 94 benchmarks. The accuracy of the geodetic benchmark measurements is at the centimeter level, while the values of deformation are at the level of a few decimeters. Therefore, the obtained data can be used to better assess the displacement recorded during the 29 December 2020 event. In the future, field research will focus on finding additional benchmarks to reach a better spatial distribution.