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Reactivation of a Deep Seated Gravitational Slope Deformation observed during the recent seismic events in Central Italy.

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Deep-Seated Gravitational Slope Deformations (DSGSDs) represent an important geomorphological feature of the European mountain chains and several cases from Central Apennine (Italy) are accurately described in literature. These phenomena generally present evident geomorphological markers (e.g. double ridges, trenches, counterslopes) and low activity rates (i.e. mm to cm per year), which can be triggered by many different means (e.g. seismic activity, erosional processes, rainfall, post-glacial debuttressing). To understand which is the most influential factor in DSGSDs' activity is rarely an easy task because this can vary from case to case.
This work illustrates the outcomes provided by a monitoring activity conducted along the Mt. Frascare slope (Fiastra Lake, Marche region, Italy). The monitoring system is composed by 4 low cost GPS stations, based on single-frequency receivers, and 2 double-frequency GPS stations, aimed to cross-check the surface deformations measured by the two types of monitoring stations.
The 6 GPS stations have been operated in place starting from October 2014 grounded on the base of a geomorphological field survey of the investigated phenomenon. Two stations have been equipped with both receiver types in order to facilitate the comparison of the results.
The Fiastra DSGSD affects a marly limestone bedrock throughout a >5km2 area and along a slope against which a dam for hydroelectric power leans. Our monitoring system allowed to measure the Fiastra DSGSD's seismically induced relative displacements on the order of two mean steps of about 10 cm, due to the recent seismic sequence occurred in Central Italy in 2016, which resulted considerably higher than the observed mean annual velocity (≈5mm/y).