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Surface displacements following the Mw 6.3 L'Aquila earthquake: One year of continuous monitoring via Robotized Total Station

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We present the results of a continuous monitoring of the surface displacements following the April 6th 2009 L'Aquila earthquake in the area of Paganica village, central Italy. We considered 3-dimensional displacements measured via Robotized Total Station (RTS) installed the April 24th 2009 in the area of Paganica village (ca. 5 km ENE from L'Aquila town), where a water pipeline located within the urban centre was severely damaged. The RTS ran continuously for about one year, with high sampling rates, and measured displacements at selected point targets. The revealed surface displacements are in agreement with the results of a DInSAR time series analysis relevant to satellite SAR data acquired over the same area and time period by the Italian satellite's constellation Cosmo-SkyMed. Moreover, despite the RTS monitored area was spatially limited, our analyses provide detailed feedbacks on fault processes following the L'Aquila earthquake. The aftershocks temporal evolution and the post-seismic displacements measured in the area show very similar exponential decays over time, with estimated cross-correlation coefficients values ranging from 0.86 to 0.97. The results of our time dependent modelling of the RTS measurements suggest that L'Aquila earthquake post-seismic displacements were dominated by the fault afterslip and/or fault creep, while poroelastic and viscoelastic processes had negligible effects.