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Development of multi-purposes procedures and service tools for GNSS data processing finalized to monitor a deep-seated earthslide in the Dolomites (Italy)

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The Corvara landslide is an active, large-scale, deep-seated and slow moving earthslide of about 30 Mm3 located in the Dolomites (Italy). It is frequently damaging a national road and, occasionally, isolated buildings and recreational ski facilities.
In this work we present the analysis performed on data acquired thank to the installation of 3 DualFrequency GPS in permanent acquisition installed in the accumulation, track and source zone of the active portion of the landslide. In particular two years (2014 and 2015) of data were processed with several approaches and goals: daily time series were produced through Precise Point Positioning and Differential Positioning using both scientific packages and automatic on line tool based on open source libraries, specifically developed in order to provide a prototypal service. The achievable results based on single frequency (L1) data processing were also investigated in order to pave the way to the deployment of lowcost GPS receiver for this kind of application.
Moreover, daily and sub-daily phenomena were analyzed. Different strategies were investigated in order to describe the kinematics on the basis of 0.2 Hz data collected by the 3 permanent receivers. For particular events also the variometric approach, through the recent advances of VADASE, was applied, to detect significant movements. Finally, tropospheric parameters were estimated over the whole period in order to give a contribution to the SAR interferometry techniques. Also for this specific purpose and application, the possibilities of single frequency use were assessed.