Mapping and kinematic history of active landslides in Panachaikon Mountain, Achaia (Peloponnese, Greece) by InSAR Time Series analysis and its relationship to rainfall patterns

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We investigate the kinematic behaviour of active landslides at several well-known locations around the Panachaikon Mountain, Achaia (Peloponnese, Greece), using space geodetic data (InSAR/GNSS). We process LiCSAR interferograms produced by Sentinel-1 (C-band) acquisitions using the open-source software LiCSBAS and we obtain average displacement maps for the period 2016-2021. The maximum displacement rate of each landslide is located at about the centre of each landslide. The average E-W velocity of the Krini landslide is 4 cm/yr (towards east) and 1 cm/yr downwards. The line-of-sight (LOS) velocity of this landslide compares well to a co-located GNSS station within (±) 3 mm/yr (25mm/yr for InSAR and 28mm/yr for GNSS for the descending orbit). Our results also suggest that there is a correlation between rainfall and landslide motion. A cross-correlation analysis of our data suggests that the mean time lag was 13.5 days between the maximum seasonal rainfall and the change of LOS displacement rate. Also, it seems that the amount of total seasonal rainfall controls the increase of displacement rate as 40-550% changes of the displacement rate of the Krini landslide were detected, following a seasonal maximum of rainfall values at the nearby meteorological station. A large part of this mountainous region of Achaia suffers from slope instability that is manifested in various degrees of ground displacement (detectable using space geodesy) affecting greatly its morphological features and inhabited areas.

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