



Analysis of DSGSDs activity in the Central European Alps

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SqueeSAR technique for SAR interferometry was applied to study the activity of 237 DSGSD located in the Central European Alps (Graubünden canton, Switzerland and neighboring areas). This second-generation PSInSAR approach (Ferretti et al., 2011) allows to identify spatially dense measurement points in non-urban areas and to filter effectively the atmospheric disturbances by exploiting signal returns from both Permanent (PS) and Distributed Scatterers (DS). In the study area, DSGSDs occupy 1270 km² (9.7% of the total area) with an estimated volume of about 6.6 km³ (Crosta et al, 2013). In order to classify DSGSDs according to their state of activity, we calculated various statistics of the displacement rate for each DSGSD. To account for the dispersion of displacement rate values, and to reduce the effect of underestimation of the mean, we adopted as a representative statistic the mean value reduced by 1 standard deviation ($\mu-\sigma$). With this measure, we observe that 90% of the DSGSD can be considered as active, with a negative displacement rate lower than 1 mm/yr, which corresponds to the approximate standard deviation of the measurements. The modal values of displacement rate is 2 mm/yr, and the maximum value is 20 mm/yr. Even if the displacement rate is extremely low, it is reasonable to assume that this activity has been continuous since the post-glacial age, thus resulting in a significant cumulative displacement on a long time scale of extremely large volumes. Considering the huge volume involved in these phenomena, we conclude that DSGSDs can significantly contribute to denudation of the Alpine orogen.

Crosta GB, Frattini P, Agliardi F (2013) Deep-seated gravitational slope deformations in the European Alps. *Tectonophysics*, 605:13–33.

Ferretti A, Fumagalli A, Novali F, et al (2011) A New Algorithm for Processing Interferometric Data-Stacks: SqueeSAR. *IEEE T Geosci Remote* 49:3460-3470.