



Hotspot analysis of persistent scatterers for hazards identification in the Arno river basin (Italy)

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Permanent Scatterers Interferometry (PSI) is a consolidated technique. It produces radar benchmarks derived from a multi-interferogram analysis of SAR images in which temporal decorrelation and atmospheric disturbances have been removed. PSI technique has shown its significance for ground instability detection. It is able to detect ground movement with the accuracy of millimeters. However, in the Arno river basin (Italy), the effective extraction of information useful for hazard identification is somewhat difficult due to the large number of PSI data that can be present, thus entailing long interpretation times. With the intention of developing a procedure for detecting ground instability rapidly and (semi-) automatically, we perform a hotspot analysis on the PSI data present within the basin. The aim is to use the PSI data processed from 4 years (2003-2006) of RADARSAT SAR images to identify potential hazards in hilly and mountainous areas. We choose the G_i^* statistics for the local test on PSI datasets and use the detected velocity as the weighting factor. Both high positive and low negative G_i^* values imply the clustering of relatively rapid mass movements. The high positive results indicate movement towards the sensor along the satellite Line-of-Sight (LOS) whereas the low negative values suggest the movement away from the sensor. In addition, we employ the kernel function for the density estimation based on the G_i^* values so as to generate the hotspot map which indicates the existing ground movements. The potential hazards related to the detected hotspots are then analyzed for the purpose of further risk management and governance.