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Use of remote sensing data for supporting landslide risk management: case history of Cavallerizzo, Cosenza Province, Southern Italy

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Following landslide movements which occurred in March 2005 in Southern Italy, affecting the village of Cavallerizzo (Cosenza Province), the Italian Civil Protection Department (DPC) asked the Department of Earth Sciences, University of Firenze, competence centre of DPC for hydrogeological risk, to monitor the area using remote sensing data from both radar processing (Permanent Scatterers PS) and optical very high resolution(VHR) satellites images (Quickbird, Ikonos satellites). A good Quickbird archive image was acquired (dated on January 2003) while a new acquisition from the Ikonos satellite was programmed and resulted in a very good, clear image for 17 March 2005, shortly after the events occurred. These images were orthorectified and processed by means of radiometric and spectral enhancement; they were also rendered on a digital elevation model giving the 3D perspective views. These data were photo interpreted to underline the changes between the two acquisitions: individual landslides and unstable areas were recognised and mapped. These data were integrated with information from Standard Permanent Scatterers Analysis (SPSA), performed using an ascending and descending radar image data set collected by ESA ERS satellite over the nine year period 1992-2001. This technique is a powerful tool in detecting and monitoring land movements and superficial deformation as it allows the identification of natural radar benchmarks. The interpretation of PS provided information on the deformation rate and gave evidence of older unstable areas, as well

as those affected by recent movements. Moreover, ancillary data were collected such as orthophotos, thematic maps on geology, geomorphology, tectonics and topography. All these information were integrated in to the G.I.S. environment. The analyses of the area affected by land movements was performed in 5 working days only, due to the quick availability and processing of optical and radar remote sensing data integrated with ancillary data. Afterwards a field survey was carried out in order to validate and refine the results obtained from remote sensing data.