



DInSAR for landslide monitoring: case studies on landslides in the Northern Apennines (Italy)

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Space-borne SAR interferometry (InSAR) has become a powerful tool for investigating ground deformations, i.e. slope instabilities. In the last decades this approach was intensely applied to obtain accurate measurements of ground displacements without the necessity of positioning any targets on the ground. To investigate the temporal evolution of slow landslide events (few centimetres per year) differential SAR interferometry (DInSAR) seems a suitable and very appealing method.

To overcome some of the drawbacks related the current missions in C-band (i.e. temporal decorrelation due to vegetation growth and signal decorrelation induced by fast movements) the use radar data in L-band acquired by JERS was tested for DInSAR processing over the few test-sites in the Northern Apennines (Italy). L-band data with a wavelength larger than C-band allows an investigation of slope instability phenomena covered by vegetation and characterised by higher displacement rates as applicable for several mass movement phenomena in the Northern Apennine.

The main case study is the Corniglio landslide which exhibits a long history of reactivations of several hundred years and it is well investigated in terms of in-situ field campaigns, especially after the last main reactivation phase in November '94. The slope instability is a complex movement caused by different materials (clays, flysches, limestones) prone to sliding events after prolonged rainfalls. The upper part of the landslide is built up by multiple rotational-translational slides while the lower part is dominated by translational slides with earth-flows associated. The Corniglio landslide endangers a village close by and infrastructures on the accumulation zone of the slope which was used as settlement area during periods of dormancy of the landslide. Since

the main event in '94 several smaller movements occurred and were investigated.

The paper presents first outcomes from the DInSAR processing of C-band and L-band data obtained from ERS and JERS missions and results from ground validation with in-situ data (technical reports, inclinometer measurements, geological mapping).

Results from further test-sites located in the same area will be presented: The Rossena landslide and the Calita landslide, reactivated during 2004 were analysed to detect precursors for the recent movements. Therefore historical data sets of JERS images were processed to identify the temporal evolution of the fast moving sectors of the main landslide body.