

# **Testing the Applicability of Ground-based Interferometric SAR in Different Landslides of Emilia Romagna Apennines with a Civil Protection Perspective**

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**KEY WORDS:** Innovative Concepts for Sensors and Methods

## **ABSTRACT:**

Typical landslide of Emilia Romagna comprise large earthslides – earthflows whose body is partially covered by trees, meadows and sparse buildings. Less frequently, they are rockslides that are also partially covered by vegetation. In spring 2010 the Agency for Civil Protection of Emilia Romagna Region (Italy) decided to intensify surveillance of several landslide risk areas. GB-InSAR test application campaigns were kicked off on several slopes hosting buildings, roads and lifeline, with the aim to test the applicability of this relatively novel technology in such radar-hostile environmental conditions. Different landslides were monitored in spring 2010 and winter 2010-11 seasons, with measuring campaigns spanning from 10 to more than 30 days each. Results showed that the technique permits to recognize moving areas in a spatially distributed manner in most of the test sites. Nonetheless, they also made evident that at very low displacement rates – i.e. few mm during the survey period - and in presence of predominantly vegetated grounds, processing routines can affect movement quantification significantly: atmospheric correction is made difficult by the lack of coherence continuity and by the difficulties in discerning stable and moving points unambiguously. On the contrary, at displacement rates of tens of mm during the survey period, and with less densely vegetated slopes, processing has a very low impact on estimated rates, making displacement maps sound and helpful for hazard analysis. The paper deals with the various results and comments them on a civil protection perspective, with the aim to highlight advantages and disadvantages evidenced by the experimentation.