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Results of the MORFEO project: Exploiting remote sensing technology to detect, map, monitor, and forecast slope failures

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Advances in space borne, airborne and terrestrial remote sensing technologies have improved our ability to identify, map, monitor, and forecast ground deformations, including landslides. In 2001, the Italian Space Agency (ASI) launched a multifaceted call for technological and scientific applications of remote sensing technology to help identify, monitor, forecast, and mitigate natural and manmade hazards, including slope failures. Following this call, in 2007, ASI lunched the MORFEO project, a coordinated research and development initiative aimed at the development and preliminary implementation of a prototype system to support the Italian National Civil Protection Department activities on landslide risk assessment and mitigation, at different spatial and temporal scales. MORFEO, an Italian acronym for Monitoring Landslide Risk through Earth Observation technology, is aimed at the synergic exploitation of Earth observation (EO) data and technologies, consolidated and innovative ground-based monitoring tools, and existing and new thematic and environmental information, to improve the ability of the Italian National Civil Protection Department to promptly detect, map, monitor, and forecast landslides of different types, and in different physiographic environments. The MORFEO team is headed by Carlo Gavazzi Space (CGS), a leading European company in space technology, and by IRPI, a research institute of the Italian National Research Council leader in landslide investigations. CGS and IRPI are assisted by a unique multi-disciplinary team comprising research institutes, university departments and Italian enterprises collectively experts in landslide identification and mapping, slope monitoring, landslide and environmental hazard and risk assessment and mitigation, and in the innovative exploitation of EO data and technologies. MORFEO is characterized by a significant research component. Due to the difficulty inherent in the use of multiple satellite, airborne, and ground based EO technologies and information for landslide risk assessment and mitigation, executing innovative research is fundamental to the project. In this work, we report on the main research results obtained during the first two years of the project MORFEO.