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The rapid moving Capriglio earth flow (Parma Province, North Italy): multi-temporal mapping and GB-InSAR monitoring

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This research presents the main findings of the multi-temporal mapping and of the long-term, real-time monitoring of the Capriglio landslide in the Emilian Apennines (Northern Italy). The landslide, triggered by prolonged rainfall and rapid snowmelt, activated of April 6th 2013. It is constituted by two main adjacent enlarging bodies with a roto-translational kinematics. They activated in sequence and subsequently joined into a large fast moving earth flow, channelizing downstream the Bardea Creek, for a total length of about 3600 meters. The landslide completely destroyed a 450 m sector of the provincial roadway S.P. 101, and its retrogression tendency put at high risk the Capriglio and Pianestolla villages, located in the upper watershed area of the Bardea River. Furthermore, the advancing toe seriously threatened the Antria bridge, representing the “Massese” provincial roadway S.P. 665R transect over the Bardea Creek, the only strategic roadway left able to connect the above-mentioned villages. With the final aim of supporting local authorities in the hazard assessment and risk management during the emergency phase, on May 5th 2013 aerial optical surveys were conducted to accurately map the landslide extension and evolution. Moreover, a GB-InSAR monitoring campaign was started in order to assess displacements of the whole landslide area. The versatility and flexibility of the GB-InSAR sensors allowed acquiring data with two different configurations, designed and set up to continuously retrieve information on the landslide movements rates (both in its upper slow-moving sectors and in its fast-moving toe). The first acquisition mode revealed that the Capriglio and Pianestolla villages were affected by minor displacements (order of magnitude of few millimetres per month). The second acquisition mode allowed to acquire data every 28”, reaching very high temporal resolution values by applying GB-InSAR technique (Monserrat et al., 2014; Caduff et al., 2015).