Evolution of a rainfall induced landslide in Porciles, Asturias (North of Spain)

María José Domínguez-Cuesta (1), Luis Quintana (2), Juan Luis Alonso (1), and Silverio García Cortés (3)

(1) Departamento de Geología, University of Oviedo, Spain, (2) Instituto Geológico y Minero de España, Oviedo, Spain, (3) Polytechnic College of Mieres, University of Oviedo, Spain

Asturias is a province of the Northern Spain, characterized by an abrupt relief (15º average slope), humid climate (960 mm/yr. rainfall) and a varied substratum mainly composed of sedimentary rocks (mostly limestones, sandstones and lutites). Landslide events, frequently linked to rainfall, are widely extended all around the region, affecting both infrastructures and people, which are largely scattered on it.

The 6th of March of 2016 one of these instability events took place near the Porciles village (43º24'N 06º18'W), moving more than 10,000 m3 of land down, totally occupying the N-634 road. The main conditioning factors of this gravity movement were the modified geometry of the slope during the construction of the N-634 road and the lithology (mainly lutites and unconsolidated colluvial deposits). The rainfall is considered as the triggering factor.

More than 4 months elapsed between the landslide occurrence and the initiation of the destabilized mass removal, after having stabilized the crown area. A landslide evolution study carried out during that period is presented in this work. The study is based on i) weekly oblique photographs taken from several fixed points, ii) three DTM constructed: one from previous topographic data and two LIDAR models obtained from drone flights and iii) rainfall data collected from the closest gauges to the landslide, including pre-sliding data. Several straight infrastructures affected by the landslide (an auxiliary road, some ditches and fences, among other elements) have been used as references. In this study we analyze, mainly, the relationship between the rainfall data and the evolution of the slide.