The Tramuntana range (Majorca, Spain) was declared a World Heritage Site by UNESCO in 2011 in the Cultural Landscape category. The cultural heritage is made up of paths, terraces, walls and traditional constructions in dry stone to extend farmland, improve harvests and prevent damage from soil erosion and very frequent slope movements. The region also contains an exceptional hydraulic heritage to exploit water on an island with long, dry summers.

The geological setting favours the existence of lateral spreading. The thick layer of the limestone formation, which constitutes the scarp, overlie soft and plastic materials and are linked with gypsum from the Keuper, and both are laterally unconfined on the coastal face. The distension determines the strong upper layer fracture and their separation into strips, moving along the slope. Additional factors favour lateral spreading. Numerous cracks are identified affecting the cultural heritage elements.

The northern coast of the Tramuntana Range (World Heritage Site by UNESCO in 2011) is characterised by a steep topography where several gravitational processes are recognisable. A block and slat-type lateral spreading is described in the coastal area of Bàlitx, where numerous elements of cultural heritage are identified. The Bàlitx site was occupied by farming areas with dry stone constructions and water storing systems of both Roman and Islamic origin. Lateral spreading processes are favoured by local stratigraphy and tectonics in an energetic coastal dynamics scenario. PSI/SAR results reveal that the rate of movement for the Bàlitx lateral spreading is extremely low (~0.2 m/yr on average), but major activity has been detected in the NE sector, where velocity rates can reach values of up to ~16 m/yr. A vulnerability approach has been developed to take the elements of cultural heritage into account. Vulnerability increases from SW to NE, in accordance with landslide activity. The Bàlitx case study could provide a testimony to the effects of mass movements and coastal dynamics in an exceptional example of Mediterranean agricultural landscape.

The island of Majorca in the western Mediterranean and the Tramuntana range in the northwestern part of the island where the Bàlitx site is located. The geological map of Mallorca (Based on Sálat et al., 2011) shows the main geomorphological domains. The Tramuntana range is a Keuper Alpine structure and consists of a series of NW directed thrust sheets. The post-orogenic basins (Palma, Inca and Sa Pobla) are semi-graben developed along normal faults at the foot of the mountains. The coastal fringe of the Tramuntana range has a NE-SW trend, parallel to the main tectonic structures.

The PSI results (ALOS PALSAR 2007-2010) superimposed onto the cultural heritage inventory map. The cultural heritage polygons have been differentiated based on an average velocity value of <5 m/yr (in green) and >5 m/yr (in yellow).

**CONCLUSIONS**

**THE SITE**

The Tramuntana range (Majorca, Spain) was declared a World Heritage Site by UNESCO in 2011 in the Cultural Landscape category. The cultural heritage is made up of paths, terraces, walls and traditional constructions in dry stone to extend farmland, improve harvests and prevent damage from soil erosion and very frequent slope movements. The region also contains an exceptional hydraulic heritage to exploit water on an island with long, dry summers.

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