



## **Monitoring an active mass movement in the Asturias cliff coast (North of Spain): preliminary data**

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The Asturian coast constitutes an eminently rocky and abrupt E-W trending line in the Cantabrian Sea, in the North of Spain (SW of Europe). The rocky cliffs geomorphological evolution is mainly due to mass movements linked to gravity and marine dynamics processes that cause its retreat.

The Tazones Lighthouse (43° 32' 54"N, 5° 23' 57"W) is located 110 m above sea level, in the central coast of Asturias, on a marine terrace developed on Jurassic rocks and limited by vertical cliffs. In February 2018, a restaurant located in the surroundings of the lighthouse had to be evicted and subsequently demolished due to irreversible structural damages that appeared because of the general movement of the hillside. This fact was coeval with the beginning of the COSINES Project, addressed by our research group and granted by the Spanish Government to study the Asturian rocky coast evolution. Therefore, this area was one of the three chosen along the Asturian cliff coast as pilot areas to monitor its evolution.

Field works, including the recognition and mapping of the Tazones Lighthouse zone, allowed us to detect a set of cracks. All together, they are about 500 m in length, ranging between several cm and more than 2 m in width, and more than 10 m in depth. They are spatially distributed with a general NW-SE trend affecting an area of ca. 20,000 m<sup>2</sup> to the West of the lighthouse. The whole set is interpreted as the head of a huge slide moving down towards the sea.

The 12th of June 2018, 24 topographical markers were installed close to the cracks, to measure the evolution of their opening. After seeing the appearance of new cracks, 10 new markers were placed the 18th of December 2018. From June 2018 to December 2018, five monitoring campaigns were carried out to control the opening of the cracks and the movement evolution by infrared total station.

First results indicate that, after the 189 days of monitoring between June 12 and December 18, some markers have moved more than 30-40 cm horizontally and some others exceed 10 cm of vertical movement. These preliminary results allows us to highlight the interest of gravity process as active processes controlling the evolution of the cliffs of the Cantabrian Coast, as well as their potential implications in hazard assessment.