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The fast evolution of the Tazones Lighthouse landslide (N Spain): multidisciplinary 3D monitoring between 2018 and 2019

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The Tazones Lighthouse landslide is an active mass movement affecting a stretch of the Cantabrian Coast (N Spain), characterized by the presence of almost vertical rocky cliffs developed on Jurassic rocks. The area is being monitored since 2018 when irreversible structural damages appeared in a building located in the surroundings of the lighthouse because of the fast evolution of the landslide.

On June 2018, the first 24 topographic marks were installed by the COSINES Project researchers and 10 more were set up on December of that year, after the appearance of new cracks. Since then, monthly monitoring campaigns have been carried out by total station to gauge the displacement of the 34 mentioned marks and 4 additional control points. One of the control marks was lost, between January and February 2019, due to the fast evolution of the movement. Monitoring has been complemented by the elaboration of detailed digital terrain models through drone flights carried out in November 2018 and November 2019. In addition, precipitation data registered on the rainfall gauges of the surroundings have been collected.

This contribution presents the recent fast evolution of the Tazones Lighthouse landslide, affecting an area about 70.000 m^2 and characterized by relevant horizontal and vertical displacements. Since the beginning of the 3D monitoring, the 50% of the marks have moved more than 1 meter and 34% of them have moved more than 2 meters, one of them exceeding 14 meters of displacement.

The detailed digital terrain models have allowed quantifying the volume of mobilized mass over a year from the main head of the movement, located 110 meters above sea level. Moreover, the comparison of these data with precipitation records has led to relate the evolution of the displacement with the rainfall, being able to establish a very good correlation between precipitation distribution and movement acceleration.