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InSAR Study of a Landslide affecting a coastal area in Matxitxako Cape in the Basque Country

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Strong motion affecting coastal area and surrounding infrastructures may lead to potential risk of human life, socio-economic losses and environmental issues. During recent years, ground motion monitoring using radar satellite technology to analyse stability has been increasingly applied in Natural Hazards detection and subsequent assessment. This is especially applied in projects related with landslides monitoring.

Landslide instabilities typically occur in natural environments largely affected by temporal decorrelation phenomena in which DInSAR performance generally decreases. This fact leads to a poor number of reliable measurement data and compromises the performance of PSI techniques. In the case of natural coastal environments, the decorrelation is even higher as it is strongly affected by erosion caused by the sea. This issue is especially important in these types of applications, where improving the density of persistent scatters as much as possible is a key factor for reaching a better understanding of the extension of the landslide and dynamics.

The work proposed in this paper shows an advanced Persistent Scatter Interferometry (PSI) processing based on the optimization of interferometric selection and subsequent filtering for improving the amount of measurement points obtained. The study is focused in a case study of the landslide of Matxitxako cape, in a very rough coastal area, severely affected by erosion and rock fall, located in the Basque Country (Northern Spain). The landslide affects severely the area, including several critical infrastructures present in the slope.