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Four years of soil strain monitoring on Etna Volcano Mount by means of a Three-axial Fiber Bragg Grating Sensor

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Rock strains detection is one of the principal ways to monitor geohazards. Classic strainmeters are cumbersome, hard to install and very expensive. Opto-electronics devices based on fiber Bragg grating technology allow to realize strainmeters with high sensitivity, low-cost, small volume and high performance.

We present the long term result of continuous soil strain monitoring on the Etna mount by a three-axial fiber Bragg grating sensor. The sensor has been developed in the framework of European Project MED-SUV (MEDiterranean SUPersite Volcanos). The installation site is a 8.5 meters deep borehole at a distance of about 7 km South-West from the summit craters of the Etna mount, at an elevation of about 1740 meters. This kind of sensor has a resolution better than 100 nanostrains on a daily timescale. Despite it is only a prototype, the sensor has worked for four years with a duty-cycle higher than 90% detecting both fast event, as earthquakes, and slow event, as epochal rocks strain behavior.