

Strain recording using a new fiber-optic Bragg-grating sensor

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Strain recordings from tiltmeters or borehole volumetric strainmeters on volcanoes reveal extremely rich signal of deformation associated with eruptive processes. The ability to detect and record signals of the order of few tens of nanostrain is complementary to other monitoring techniques, and of great interest to monitor and model the volcanic processes.

Strain recording remains however a challenge, for both the instrumental and the installation point of view. We present in this study the first results of strain recordings, using a new fiber-optic Bragg-Grating (FBG) sensor. FBG sensors are known for many years and used as strain gauges in civil engineering. They are however limited in this case to microstrain capability. We use here a newly developed interferometer named SWIFTS whose main characteristics are i) an extremely high optical wavelength precision and ii) a small design and low power requirements allowing an easy field deployment. Our FBG sensor use a 3cm long Bragg network, and could ultimately present an alternative to larger sensors. We present the first results from the recording obtained in the low noise underground laboratory at Rustrel, south of France.