

Monitoring of ground movement with Fiber Optic systems

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Fiber optic (FO) strain sensors are a promising new technology for advancing the state of the art in in-situ ground movement monitoring. Advantages include high resolution, rapid sampling rate, multiplexing potential, and insensitivity to electrical disturbances (such as lightning). FO monitoring system can detect sub-micrometer scale deformations in both triggered-dynamic and continuous operating modes. To date, however, there are only a few cases where FO strain sensors have been used for monitoring large slope deformation (> decimetric displacement per year). Several technologies exist (long-gauge fiber Bragg grating sensors, Raman-Brillouin backscattering sensors) and need to be evaluated both in laboratory controlled tests and in field conditions (effect of temperature, type of material, etc). The deformation time series acquired on several ground movements (landslides, glaciers) and man-made objects (tunnels, dams) where FO have been recently installed will be analyzed and compared to other displacement measurements. Forward modeling of ground deformation will be carried out to simulate the strain field, and gain new insight in the deformation process.

Collaborations: Geosciences Montpellier / Isterre Grenoble