



Landslide monitoring using low-cost RFID localization techniques

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This study investigates the usability of radio-frequency technology to track landslide displacements, using multiple 868Mhz passive tags. It answers to a need to monitor surfacic motion in real-time, at low cost. An active slow landslide was instrumented over five months, with eighteen tags installed at a range of 20 to 55m from a base station. The tag motion was tracked using the phase of their backscattered signal, during 5 months. This method was compared with an automatic wire extensometer, and optical surveys. The techniques showed the same results, with an error below 1.5 cm, over a total displacement of 80 cm, compared with optical surveys. Furthermore, the RFID technique proved to be more stable than the wire extensometer during rain and snow events, by a factor 10 and 100, respectively. The high accuracy of the technique allowed for a fine comparison with rainfall and seismic ambient noise monitoring, and a better understanding of their relation on this site. Finally, the capabilities of a multi-tag deployment were assessed. The results demonstrate that location tracking of radio-identification tags is appropriate to track landslide slow motion, with multiple sensors, at low cost.