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Landslide Monitoring through Spatial Sensor Network

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A multi-source spatial sensor network (SSN) has been constructed to strengthen the landslide monitoring activities in the mountainous areas in Western China. This contribution introduces the concept, design and implementation of SSN into a giant landslide monitoring. The giant landslide is located in Xishan Village, Li County, Sichuan Province, situated in the upper Minjiang River area that is considered as a very unstable slope area after the "5.12" Wenchuan Earthquake in 2008. This SSN framework mainly concentrates on constructing a monitoring network with four hierarchies of observation: (1) space-borne sensors including VHR optical images (P5, IKONOS, WorldView-1, 2 and ZY-3) and a series of high resolution X-band TerraSAR-X SAR images; (2) aerial observations by a group of UAV scanning schemes with the ground-based controlling platform, the produced the 1:2000 scale DOM mosaic images and the generated high resolution DTM; (3) a series of ground-based sensors involving in-situ sensors such as inclinometers and piezometers with smart self-forming seamless real-time data communication and terrestrial remote sensing platform of laser scanning; and (4) internal investigation from geophysical approaches such as seismological and electromagnetic analyses. This SSN-based monitoring system for Xishan Village landslide based on multiple surveying and mapping approaches is expected to provide solid monitoring data for landslide models and data assimilation for potential landslide hazard prediction and risk assessment in the near future.