

Landslide Monitoring in the Three Gorges Region (China) using InSAR Time-Series Techniques

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Landslides are the most widespread natural hazard in the Three Gorges region, often posing a risk to populations bordering the Yangtze River and its tributaries. Following construction of the Three Gorges Project over the last decade, periodic water level rises and fluctuations have also been shown to reactivate ancient landslides. Real-time monitoring systems can observe individual landslides but are costly to install and maintain over large areas. To address this, regional hazard susceptibility maps are becoming more common although the results are strongly dependent on the included causal factor maps. The use of Synthetic Aperture Radar (SAR) sensors and Interferometric SAR time-series techniques (e.g. Small Baseline InSAR) should therefore be employed to obtain accurate measurements of surface deformations over a range of spatial scales. In addition, large repositories of data enable the reconstruction of surface motions prior to known landslides. This study shows the increased spatial resolution and reduced sampling intervals offered by newer SAR sensors (e.g. TerraSAR-X and COSMO-SkyMed) are complementary data sources for landslide monitoring in the Three Gorges region when compared to sensors which can cover wider areas (e.g. Envisat ASAR). Selected results are finally incorporated within a simple landslide model to help determine the causal mechanisms. Identifying new landslides and assessing whether preemptive signals exist before sudden landslides will enhance the current understanding of landslides in the Three Gorges region and should help mitigate the effects on local communities.

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