

Landslide Identification, Movement Monitoring and Risk Assessment Over Rugged Mountain Areas Using Advanced Earth Observation Techniques

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The proposed project aims to carry out an extensive exploitation of available remote sensing data to evaluate their importance for hazard and risk management and disaster prevention. This includes the detailed documentation of landslides occurrences for the past decades and the analysis of current movement trends which are required to predict future conditions.

The traditional technique like levelling and GPS network have been applied to the landslides movement monitoring but it is labour, financial consuming and not efficient, especially in mountain area. While mountain area are hazardous regions, according to the information provided by the Chinese Geological Survey Bureau most of the land subsidence geological hazard happened in mountain area. In China approximate 2/3 areas are the mountainous area and there is 56% people lived in mountainous area, approximately 95% national minority life in mountainous area. So how to monitoring landslide in complex terrain area become one urgent research work.

It is important for government to obtain the land surface movement information and assist to make applicable policy to avoid serious hazards and environmental problems. In Longnan, a landslide inventory map in which landslides types and their state of activity are displayed within a GIS database is to be made.

The study also focus on some critical technique study of InSAR and LiDAR, the output will help government to find the sign of the landslides, the most importance is that InSAR could be used in fog and raining weather, so it is very useful in raining weather landslides monitoring. Also, the acquisition of ground-based displacement data will be used to validate results from remote-sensing data.

Another contribution of the proposed project is the application of dedicated landslide models to describe the regional susceptibility to landslide events, and forecasts of future landslide behaviour also with respect to global change.

基于先进地球观测技术的山地滑坡识别、运动监测和风险评估

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项目将充分利用当前可用的遥感影像数据进行山地滑坡识别，同时结合研究区域过去滑坡发生的历史资料，进行运动监测并分析最近的活动特征和预测未来发生趋势，从而评估先进的地球观测技术在滑坡灾害和风险管理及防灾减灾重要意义和价值。

地表活动监测常常利用水准测量和GPS网技术，但是这类传统技术通常要耗费大量的人力和物力，同时效率也很低，在山区滑坡监测方面这样的缺陷导致的问题更加突出。中国大约三分之二是国土面积是山区，56%的人口居住在山区，大约95%的少数民族生活在山区，根据中国地质调查局的资料显示大部分的地质灾害发生在山区，因此，对山区滑坡灾害的识别、监测和风险评估成为一个迫切的科学研究问题。

欧空局和中国卫星数据将为实现研究目标提供理想的数据源，拟采用多种遥感数据分析方法建立多个时期滑坡编目数据库。使用卫星干涉测量数据恢复和分析滑坡的活动历史，获得准确的滑坡体运动和稳定性信息，并通过实地测量和地基监测结果来验证卫星干涉测量的结果。区域尺度的滑坡敏感性评价和局地尺度的滑坡模拟将能够恢复滑坡活动的历史和预测未来滑坡的活动趋势。而定量的滑坡灾害和风险分析结果将有助于地方政府更加科学地进行滑坡灾害管理和防灾减灾服务。

本项研究涉及干涉合成孔径雷达和激光雷达的部分关键技术，其成果将帮助政府找到山体滑坡是否发生的迹象。其中关键点在于干涉测量技术在大雾和降雨时仍能正常使用，所以它在降雨时能够对山体滑坡进行有效的监测。此外，还将利用获取的地面位移数据与遥感数据判读的结果进行对比验证。项目还将应用滑坡模型进行区域尺度的滑坡敏感性评价，并在全球变化背景条件下预测未来滑坡的活动趋势。

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