

## 基于星载 SAR 干涉技术的地质灾害监测应用

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### 摘要:

地质灾害监测在预测与缓解自然灾害的破坏,保障人类生命和重要基础设施安全,以及促进地灾易发区的可持续发展等方面起到了至关重要的作用。全球的地面沉降和滑坡事件日益增多,对人类住区和关键基础设施构成了重大威胁,需要密切的关注和采取相应的减灾措施。为实现与地质灾害相关风险的有效管控,并尽可能最小化其影响,关键在于测量灾区地表形变以及充分了解灾害的形成机理。本报告的相关研究成果主要依托于欧洲航天局(ESA)和中国科技部(MOST)合作的“龙计划”第五期(Dragon-5)项目,项目ID为59339,项目名称为“用于地震危险评估和滑坡预警系统的对地观测”。在过去一年内,本研究团队开展的主要工作如下:a)基于对地观测技术,在地面沉降和滑坡等活跃形变区开展广域的自动化监测以及分类;b)基于InSAR和现场数据,探究致灾因素,并对典型滑坡和地面沉降进行建模。本项目选取的地灾区域主要集中于中国和西班牙的脆弱灾害易发区,相关的研究成果可为今后滑坡与地面沉降监测等科学工作的开展提供参考价值。这些地质灾害的综合分析也为地灾的有效防控,以及灾后的快速响应发挥着至关重要的作用。

## Application of spaceborne SAR interferometric to geohazard monitoring

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### Abstract

Geohazard monitoring is essential to anticipate and alleviate the hazards of natural disasters, safeguard human lives and critical infrastructure, and promote the sustainable growth of communities located in areas prone to such events. The increasing incidence of land subsidence and landslides poses a significant threat to human settlements and critical infrastructure worldwide, requiring urgent attention and mitigation measures. To effectively manage the risks associated with geohazards and minimize their impacts, it is of utmost importance to map their displacement rates and gain a comprehensive understanding of their mechanics. In this work, the main outcomes relevant to the joint European Space Agency (ESA) and the Chinese Ministry of Science and Technology (MOST) Dragon-5 initiative cooperation project ID 59339 "Earth observation for seismic hazard assessment and landslide early warning system" are reported. During last year, the research team has been mainly working on: a) EO monitoring, automatic mapping and classification of active displacement areas related to land subsidence and landslides on wide regions; and b) identification of triggering factors and modelling of specific landslides and land subsidence based on InSAR and in situ data. The results obtained from the study, which primarily concentrate on selected vulnerable areas in China and Spain, offer valuable insights for planning current and future scientific efforts aimed at monitoring landslides and land subsidence. The comprehensive analyses of these geohazards are essential for effective prevention and management, as well as enabling prompt response in the aftermath of their occurrence.