Application Status and Future Prospects of Aerial Remote Sensing Technology for Geological Hazards: Postprint

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Abstract

Geological disasters occur with high frequency in China, resulting in particularly severe losses. In recent years, multiple major geological disaster events have demonstrated that disaster prevention and control in high-vegetation-cover mountainous areas and some inaccessible regions constrained by terrain conditions remain challenging for traditional mass monitoring and prevention approaches. Aerial remote sensing technology, owing to its unique perspective, flexibility, and other advantages, can rapidly and efficiently reveal the spatial distribution characteristics and spatiotemporal evolution patterns of geological disasters, playing a significant role in geological disaster investigation, evaluation, and emergency response. This paper, based on a brief overview of aerial remote sensing technology, platforms, and sensors, systematically summarizes the research and applications of domestic and international aerial remote sensing in geological disaster identification and interpretation, investigation and evaluation, long-term monitoring, emergency response, VR visualization, and other aspects, elaborates on the opportunities and challenges currently faced by the application of aerial remote sensing in geological disasters, and provides an outlook on the development trends of aerial remote sensing in geological disaster application research.

Full Text

Preamble

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Abstract: China experiences frequent geological disasters that inflict particularly severe losses. Recent major events have demonstrated that preventing and mitigating geohazards in densely vegetated mountainous regions and inaccessible areas constrained by terrain remains a significant challenge for traditional mass monitoring and prevention systems. Aerial remote sensing technology, with its unique perspective and operational flexibility, can rapidly and efficiently reveal the spatial distribution characteristics and spatiotemporal evolution patterns of geological disasters, playing a crucial role in investigation, evaluation, and emergency response. This paper systematically reviews domestic and international research and applications of aerial remote sensing in geohazard identification and interpretation, investigation and evaluation, long-term monitoring, emergency response, and VR visualization, based on a brief overview of the relevant technologies, platforms, and sensors. It also discusses the current opportunities and challenges facing the application of aerial remote sensing in geological disaster management and outlines future development trends.

Keywords: Geohazards; Aerial remote sensing; Airborne LiDAR; UAV; Investigation and evaluation

Note: Figure translations are in progress. See original paper for figures.