How Earth Observation Satellite Images Contributed to Natural Disaster Managements Worldwide

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ABSTRACT:
Due to a high uncertainty of the meteorological phenomena and climate change, the natural disasters are becoming more frequent worldwide. The earth observation satellite application for the disaster management is one of the most important role to implement UN's peaceful use of outer space as well as sustainable development goals.
The UN report on economic losses, poverty, and disasters 1998-2017 published by the UN Office for Disaster Risk Reduction (UNISDR) shows that a dramatic rise of 151% in direct economic losses has been caused by natural disasters during the last twenty years. The climate-related and geophysical disasters such as earthquakes and tsunamis have killed 1.3 million people over the last 20 years and left a further 4.4 billion injured, homeless or in need of emergency assistance. The affected countries reported direct losses of $2.908 trillion and that's more than twice what was lost in the previous two decades.
Satellite remote sensing provides opportunities in the whole disaster management cycle comprises four distinct phases, of mitigation, preparedness, responses, and recovery by identifying human settlements and assessing flood or landslide risk. The most remarkable contribution of remote sensing imagery is post-disaster damage assessment through change detection. The high resolution satellite imagery can be applied to detect the structural deformation of land areas, directional changes and creation of water bodies, and details about damaged infrastructures in the disaster affected area. Based on these information, rescue methods can be suggested to optimize the emergency response. While the optical satellite imagery is very advantageous to get an easy interpretation without complicated data processing, radar satellites such as the synthetic aperture radar (SAR) have been enlarging their benefits during a natural disaster to deal with the limitations of optical sensors in cloud cover, rain conditions, and at nighttime.
This study will analyze world databases and international programs such as International Charter on Space and Major Disasters to understand the trend of major disasters and real activities of space-based satellite application.
The poster presentation will include more detailed statistic tables and figures.