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International Cooperation in Earth Observation Missions (1)

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APSCO EARTHQUAKE RESEARCH PROJECT: INTEGRATING SATELLITE AND GROUND OBSERVATIONS FOR EARTHQUAKE SIGNATURES AND PRECURSORS IN ASIA-PACIFIC REGION

Abstract

Most of the member States of APSCO are in the circum-Pacific seismic belt, which are the earthquake-prone countries. Many destructive earthquakes have occurred and caused huge losses to APSCO's member States in recent decades. For examples, 2008 Mw 8.0 Wenchuan earthquake caused direct economic losses of more than eight hundred billion yuan; 2005 M7.6 Kashmir earthquake in Pakistan, killed 73,000 people and left millions of people homeless, and the sad truth is that the list of destructive earthquakes continues. With development of space observation technology in recent decades, the spatial information becomes a promising tool to earthquake precursors.

On 2nd February, 2018, China successfully launched the first CSES (China Seismic-Electromagnetic Satellite) satellite, which is designed to monitor electromagnetic field, plasma parameters and particle fluxes induced by natural and artificial sources in the near-Earth space. The CSES satellite carries 8 instruments, including search-coil magnetometer (SCM), electric field detector (EFD), high precision magnetometer (HPM), GNSS occultation receiver (GOR), plasma analyzer package (PAP), Langmuir probe (LAP), high energetic particle package (HEPP) and detector (HEPD), and tri-band beacon (TBB), among which HEPD is provided by Italian Space Agency. This satellite will provide a new way to study earthquake mechanism and space environment in Asia-Pacific region. It will bring a great opportunity to APSCO member States to promote seismic monitoring and disaster-preventing capability using satellite technology fusion with ground-based instruments with a full coverage over the region.

This APSCO earthquake research project is aimed to conduct the earthquake disaster-preventing research, by using observations from CSES satellite in conjunction with ground-based observatories from member States. Furthermore, other remote sensing satellites will work collaboratively on observations of electromagnetic field, ionospheric parameters, infrared data, hyperspectral data to study earthquake disasters in the Asia-Pacific region. By combining the ground-based and space-based data sources, a Stereoscopic Seismic-ionospheric Observation Application Platform (SOAP) will be established. The final outcome of this project will not only help to strengthen cooperation among APSCO member States on space activities, but will also help to promote socio-economic development using space technology in the region.