DETECTION OF TECTONIC ACTIVITIES ASSOCIATED WITH EARTHQUAKES BY SATELLITE-BORNE MICROWAVE RADIOMETER

TAKASHI MAEDA 1, Tadashi Takano 2

1 JAXA/Earth Observation Research Center (EORC), Tsukuba, Japan, maeda.takashi@jaxa.jp
2 Nihon University, Funabashi, Japan, takano@ecs.cst.nihon-u.ac.jp

By the recent development of a remote sensing technology, we obtained new measurements to more deeply understand the condition of the Earth's surface. For example, interferograms formed by the data of a satellite-borne synthetic aperture radar (SAR) enables us to detect faint land-surface deformations in connection with volcanic eruptions or earthquakes. However, since the time lag between two scenes of SAR used to form interferograms becomes longer than the recurrent period of a satellite aboard it, it is not clear enough when land-surface deformations occur in volcanic eruptions or earthquakes.
Therefore, we have investigated another approach to detect land-surface deformations with shorter time resolution from the data of satellite-borne sensors. Nowadays, it was experimentally confirmed that microwave energy is emitted when rocks are fractured. Land-surface deformations are likely to be accompanied by rock failures. Therefore, if rocks are crushed by land-surface deformations, microwave energy generated by rock failures is likely to be detected by a satellite-borne microwave radiometer. Based on this concept, we developed an algorithm to evaluate microwave energy generated by rock failures. An actual development and verification of the algorithm were performed by using the data of the Advanced Microwave Scanning Radiometer for Earth Observation System (AMSR-E) for the major earthquakes which occurred since the observation started. By the algorithm, we detected definitive microwave signals at the time when the main shock occurred with respect to some earthquakes. These microwave signals are highly likely to be associated with phenomena caused by tectonic activities in earthquakes. In this presentation, the process of development and verification of the algorithm is presented.

Earthquake deformation, Rock crash, Microwave remote sensing

Takashi Maeda, JAXA/Earth Observation Research Center (EORC), Sengen 2-1-1, Tsukuba, Japan, 305-8505, tel: +81-29-868-2725, fax: +81-29-868-2961, e-mail: maeda.takashi@jaxa.jp