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Definitive evidence of the earthquake-origin microwave emission in the passive sensor data of a remotesensing satellite

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Formerly, we found the microwave emission during rock crash in a laboratory for the first time in the world, and calibrated the emitted power. The detected signal is a sequence of pulses which include microwaves at the selected frequency bands of 300MHz, 2GHz and 22GHz. This fact suggested another means to detect an EQ which is associated with rock crash or plate slip.

Earthquake (EQ) detection, whether preseismic (before EQ) or coseismic (simultaneously with EQ), is important for social security. Much effort has been devoted to find effective means of detection. Mechanical motion sensors, an electric sensor to measure the change of the DC ground potential, detectors of quite low frequencies from several Hz to several kHz or FM radio receivers to find the anomaly of the ionosphere via radiowave propagation were proposed to be used on the ground. Also, synthetic aperture radars may be applied to measure the slight movement of the ground through interference data processing. But some means are lacking in the deterministic certainty, and others are impractical at the current stage of technologies.

This presentation first presents the estimation of the received power by a receiver aboard a satellite. Then, the data obtained by a passive sensor AMSR-E on AQUA satellite are described including the disturbances or ambiguity of the data. The techniques to extract microwave signatures out of disturbances are given. Finally, an example of the data analysis is explained in the case of Morocco earthquake to show distinct emission of microwaves in relation with geological features.