

## Remote Sensing of the Earth Environment

We study remote sensing technique, including space satellite based on electromagnetic wave science, and its application. Our final goal is to predict hazardous weather phenomena such as tornados and lightning and reduce their damages.

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### Development of radar network system

We have been developing a wide variety of remote sensing systems, a Ku broadband radar, a phased array radar (PAR), and lightning mappers. The PAR, which has electrical scanning in the elevation direction, has been paid attention because of its quite high volume scanning speed (10 seconds). Currently, we have a thunderstorm observation network in Kansai area, consisting of four radars and nine lightning mappers, to understand thunderstorm dynamics and electrification process. Our final goal is to predict the thunderstorm occurrence and its related phenomena, which are tornados, local severe rains, lightning, and hail damages.



Ku broadband radar



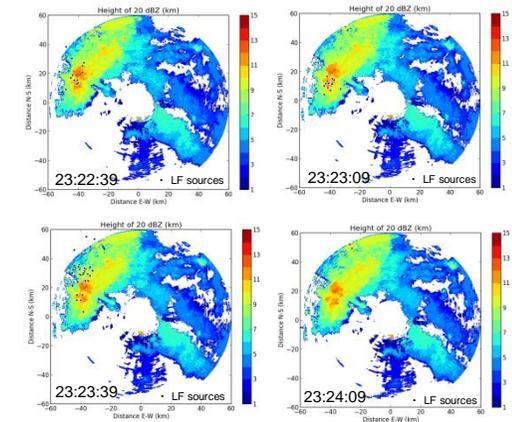
Phased array radar



VHF interferometer



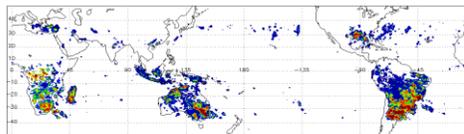
LF interferometer



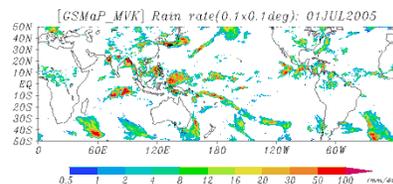
Simultaneous observation of the PAR and lightning mappers

### Data analysis

Analyses using the TRMM (Tropical Rainfall Measuring Mission)/ LIS (Lightning Imaging Sensor) data have been done. The algorithm of the high precision and high resolution Global Satellite Mapping of Precipitation (GSMaP) has been developing.



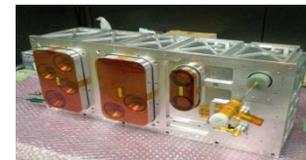
Global lightning distribution



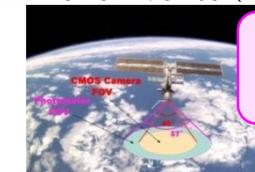
GSMaP

### Remote Sensing from Space

Electromagnetic wave observations by using two VHF sensors on ISS (International Space Station) have been carrying out from Nov. 2012. In 2013, a first detection of lightning activities succeeded in the world. Hereafter, it is expected to obtain scientific knowledge about the relationship between lightning discharges and Transient Luminous Events (TLEs).



Lightning sensors on the ISS



Observation on ISS was launched on November 2012