

EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Sensors and Technology (3)

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THE FY-3A AND FY-3B EARTH RADIATION MEASUREMENTS

Abstract

The Earth Radiation Measurement (ERM) instrument is one of the main remote sensing instruments onboard FY-3 series meteorological satellites on the polar orbit. It detects the Earth Radiation Budget (ERB) data, which means the reflected solar radiance and emitted thermal radiance of the earth and atmosphere. The ERB data is the main pointer of the climate system movement. The exact knowledge of the ERB is necessary in climate researching, and it is very important to help us to understand the changing of weather and the global climate. ERM has a nonscanner part and a scanner part, both of them have one totalwave radiometer whose spectrum band is from 0.2 μ m to 50 μ m and one shortwave radiometer whose spectrum band covers 0.2 μ m to 4.3 μ m. The nonscanner radiometers use hemisphere diaphragm which has a high reflectivity internal surface to limit the field of view, and use an activity cavity to measure the radiation energy. If the radiation power increases, the electric heating power of the activity cavity will reduce at an equal quantity. In the cavity detectors, there is a reference cavity to reduce the environment influence. The scanner part of ERM uses a scan mirror to scan the top of the earth and atmosphere surface across the flight track, and uses the cassegrain telescope optics system and a bolometer detector to gather the radiation energy. The radiation sensitivity of all channels is better than 0.2W/(m²sr). ERM uses the radiation standard transfer method for the radiation calibration, in the first a blackbody has been used to calibrate the ERM totalwave channel, then use the totalwave channel to calibrate an integrating sphere source, after this, using the integrating sphere to calibrate the shortwave channel of the ERM. In the method we use a shortwave filter to choose the spectrum range of the integrating sphere, so that the totalwave channel can calibrate the integrating sphere more accurately.