

Observations of the Earth's Radiation Budget from Geostationary Orbit and from the Surface

Anthony Slingo [as@mail.nerc-essc.ac.uk], Environmental Systems Science Centre, University of Reading, United Kingdom.

Geostationary orbits provide excellent temporal sampling for studies of the variability of the Earth's radiation budget, including the diurnal cycle. This will be illustrated using data from the Geostationary Earth Radiation Budget (GERB) instrument, launched on the European Meteosat-8 weather satellite in August 2002, which is the first broadband radiometer in geostationary orbit. Meteosat-8 is stationed at 3.5 degrees West longitude, so it has a perfect view of the African continent. GERB and the operational imager on the satellite both provide images every 15 minutes, allowing detailed studies of the diurnal cycle of the surface, upper tropospheric humidity and clouds. Comparisons with models over the region viewed by Meteosat may also be made. Since the beginning of 2006, the Atmospheric Radiation Measurement (ARM) program has deployed its new ARM Mobile Facility at Niamey, the capital of Niger, under the RADAGAST project. This has enabled coordinated observations with GERB to study the radiation balance both at the surface and from space. One goal is to provide well sampled estimates of the divergence of solar and thermal radiation across the atmosphere, with which to evaluate radiation models. An example will be shown of the successful application of this principle to derive the impact of a major Saharan dust storm on the radiation budget of the planet, of the surface and of the atmosphere.