

Meteosat-8 for African Water Resources Management



ITC – Tiger Workshop, Pretoria, 8 - 10 November 2004

Meteosat Second Generation (MSG-1)

The MSG-1 satellite (or Meteosat-8) is a geostationary satellite circling the Earth at a distance of about 36000 km. It is fully tested and operational since January 29, 2004. Every 15 minutes it transmits images of the Earth in 12 different bands, from the visible to the thermal part of the spectrum. Figure 1 to the right shows an image of July 10, 2004, 1200 hrs as a false colour composite of bands 1, 2 and 3. Bands 1 to 11 have 3 km spatial resolution at nadir, while the panchromatic band 12 has a resolution of 1 km at nadir.

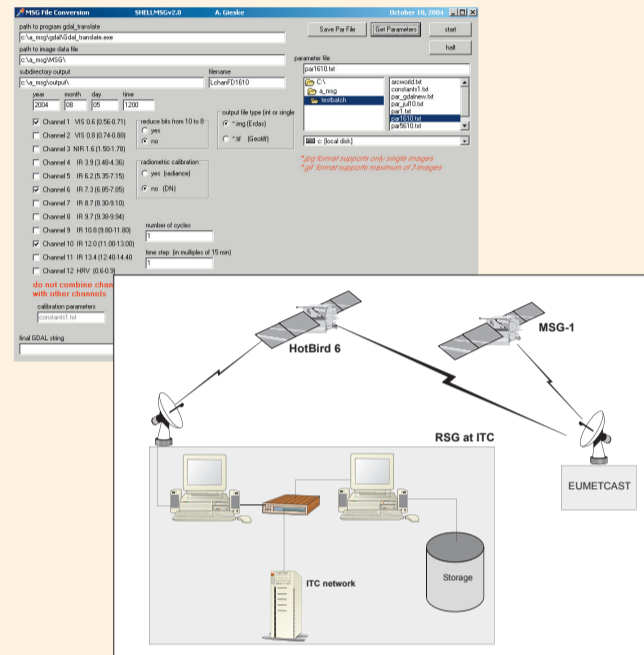


ITC reception of MSG-1 images

ITC is receiving the images under licence from Eumetsat/KNMI through the HotBird 6 link with a standard satellite receiving dish (see figures below). The image files are permanently stored at the ITC archive (8 Gb per day).

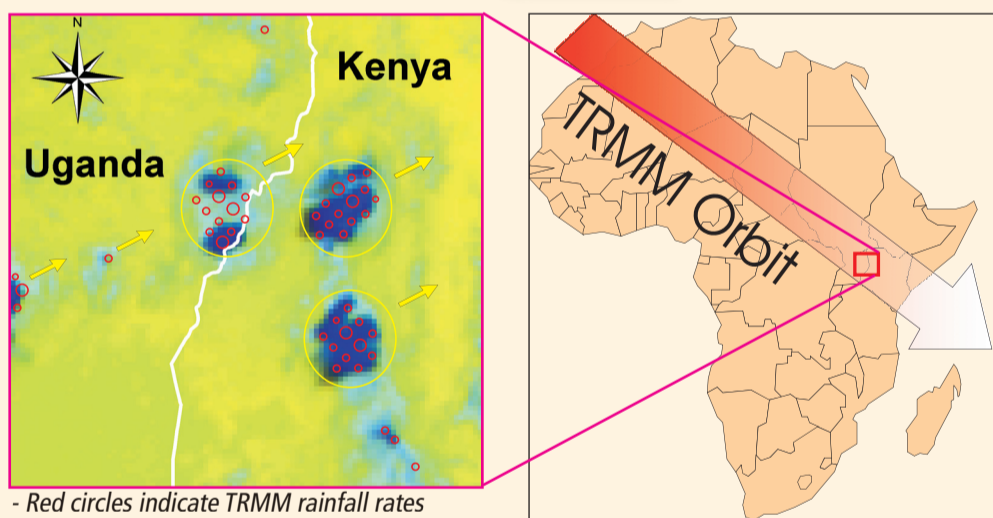
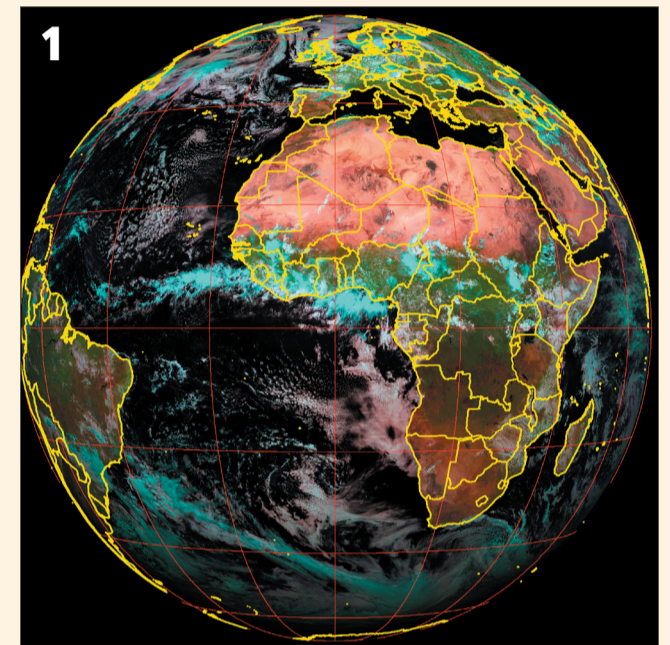
Pre-processing of images

The compressed images can be converted into a number of standard image formats with the in-house developed software. The images are geocoded and radiometrically calibrated to radiance or brightness temperature. A simple internet based user interface is under development.

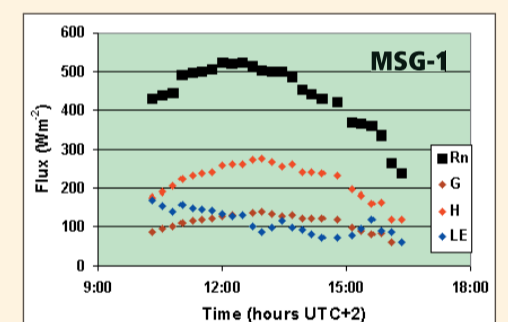
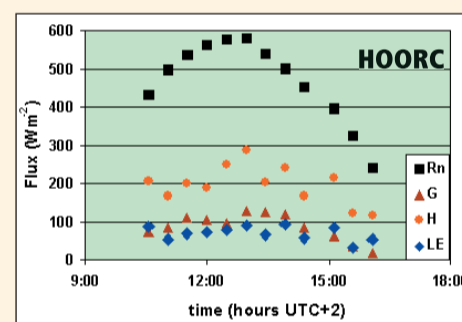


Application Examples

- * Meteorological Forecasting (or Nowcasting) up to 12 hrs ahead
- * Cloud cover
- * Determination of atmospheric water vapour
- * Determination of ozone
- * Monitoring of large bushfires.
- * Sea and land surface temperatures
- * Energy balance and Evapotranspiration modelling (see below)
- * Rainfall-runoff modelling (combining TRMM and MSG-1, see below)



- Red circles indicate TRMM rainfall rates
- Yellow arrows show direction of clouds
- Blue indicates rainfall estimates by MSG-1

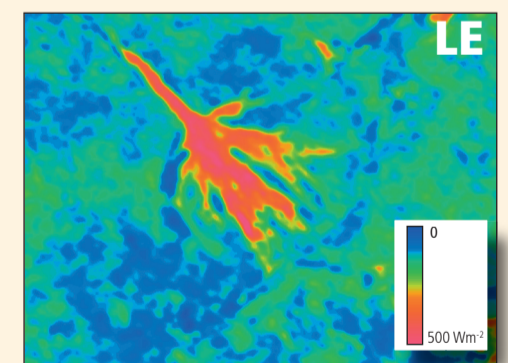
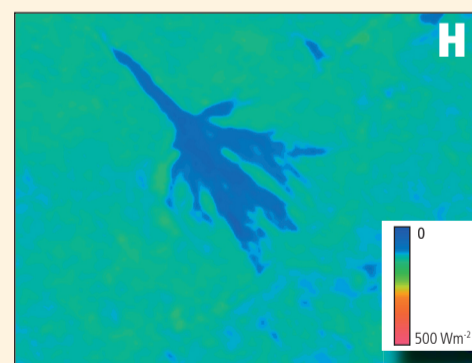
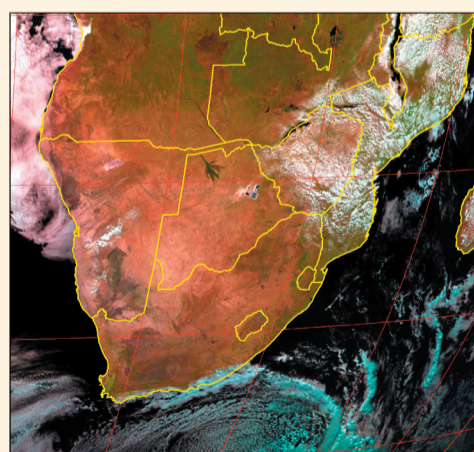


Energy balance

The diagrams above show the evolution of the energy balance during the day for Maun (Botswana) as determined with MSG-1. Also shown are measurements from the Harry Oppenheimer Okavango Research (HOORC) station in Maun during July 20, 2004. The two images below show the sensible and latent heat fluxes at 1200 hrs UTC above the Okavango Delta.

Precipitation analysis with TRMM and MSG-1

The combination of Tropical Rainfall Measuring Mission (TRMM) with MSG-1 can be used for better rainfall modelling (see image above). The TRMM satellite is in a near-equatorial orbit and covers the Earth between 50°N and 50°S. It uses a combination of IR and radar instruments to measure rainfall very accurately. However, it is only once or twice a day above the same spot on Earth. MSG-1 offers the possibility to follow the rainfall clouds during the day, because it acquires images every 15 minutes.



For more information:

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