Applications of GOES data in Brazil

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Introduction

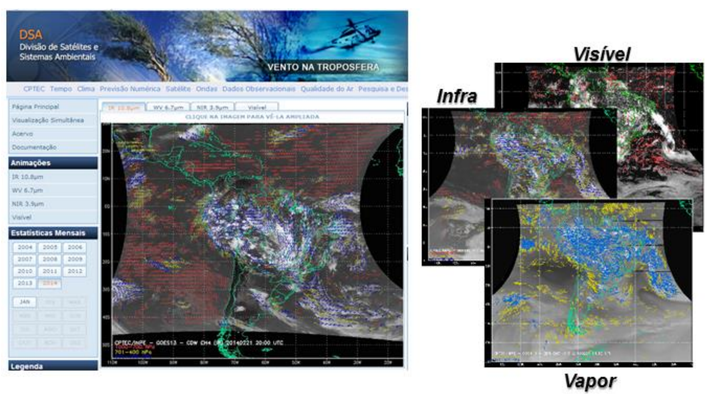
Since early eighties INPE is receiving geostationary satellite data such GOES-8, 10, 11, 12 and currently from GOES-13. The Center for Weather Forecasting and Climate Studies (CPTEC) works in continuous operation of several reception systems and meteorological and environmental satellites information. This activity involves the processing, storage and dissemination of satellite data.

Currently, GOES-13 has been successfully used in Brazil providing imagery data every 30 minutes in routine mode and every 3 hours in RSO mode. This routine reception enabled to improve weather forecasts, disaster management, drought, fires warnings and to monitor extreme weather events. Also training material on the use of GOES over South America designed to increase the forecasters' skill in incorporating satellite data in the short-range forecast, nowcasting, and warning decision makers processes.

Results

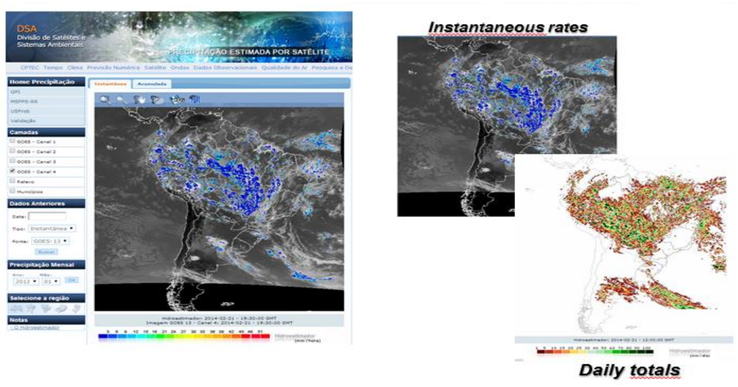
Tropospheric wind product which is estimated based on satellite images provided by GOES channels, Infrared and Water Vapor to determine the wind (vector) in fully automatic mode. The used methodology is based on the advanced version of the algorithm developed by the European Space Operations Centre.

Troposferic Winds

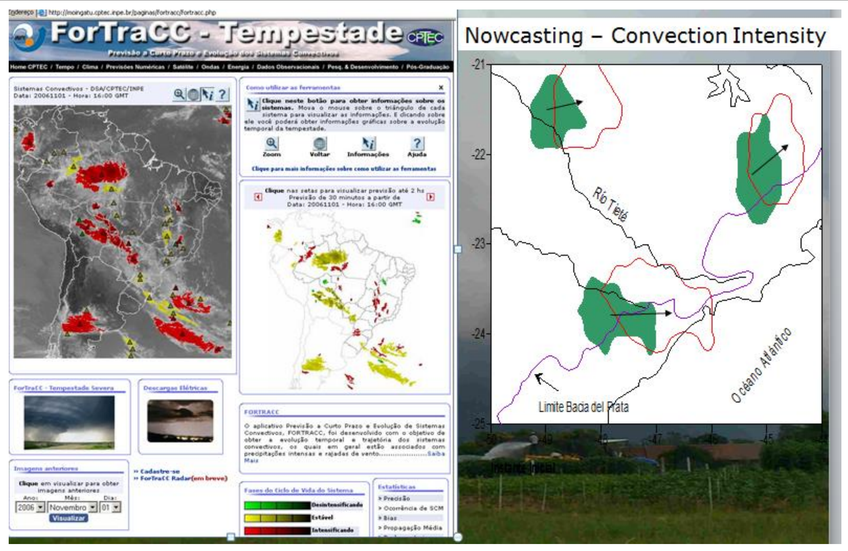


Rainfall estimates are based on the improved version of the NESDIS hydroestimator which uses a non-linear power law equation that relates cloud top brightness temperature from IR GOES channel and radar-derived rainfall rate estimates.

Rainfall Estimates

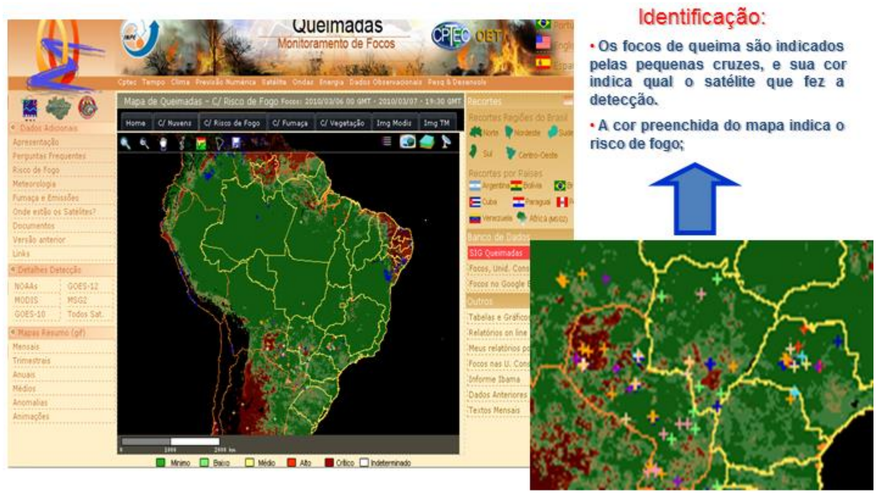


Mesoescale Convective System. FORTRACC (*Forecast and Tracking of Active Convective Cells) i*s a nowcasting system aimed to detect, track and forecast severe convective events using the full resolution IR channel (Machado et al., 1998, Vila et al., 2008). It analyses radiative and morphological characteristics of Mesoscale Convective Systems through their whole life cycles. FORTRACC is composed of four core modules: *1)* a cloud cluster detection method based on size and IR brightness temperature thresholds (TB < 235 K), *2)* a statistical module to identify morphological and radiative parameters, 3) a tracking technique based on overlapping areas in successive images, and *4)* a forecast module.



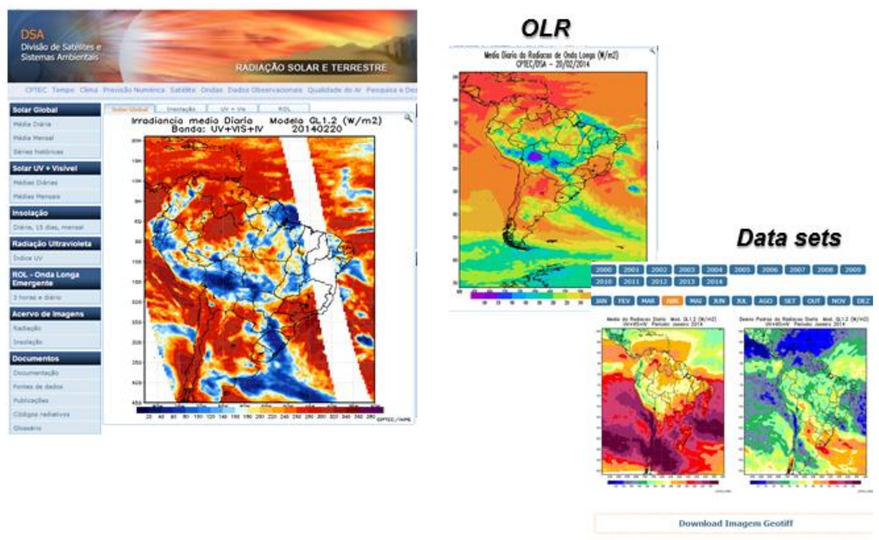
Monitoring Fires, this product generate a map showing the fires detected in all images received from satellites over the past two days over Brazil. Outbreaks of burning are indicated and the data is updated daily. To monitor forest fires a fire detection technique using GOES satellite data was developed at INPE using VIS, NIR and IR.

Monitoring Fires



Solar and Terrestrial radiation, these products are the basis for the development of methods for operational assessment of solar radiation, sunshine duration and outgoing longwave radiation as well as cloud classification and monitoring

Solar and Terrestrial Radiation



Concluding Remarks

GOES data has being particularly valuable for Brazil. Using these data CPTEC is able to derive a number of products based on high spatial and temporal resolution data. The use of GOES data particularly have improved significantly satellite detection of severe weather, atmospheric motion vector, solar radiation, cloud classification, rainfall estimates and fire detection, among other derived products.

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