Abstract

The Atmospheric Infrared Sounder (AIRS) mission began with the launch of Aqua in 2002. Over 15 years of AIRS products have been used by the climate research and application communities. The NASA Goddard Earth Sciences Data and Information Services Center (GES DISC), in collaboration with NASA Sounder Team at JPL, provides processing, archiving, and distribution services for NASA sounders: the present Aqua AIRS mission and the succeeding Suomi National Polar-Orbiting Partnership (SNPP) Cross-track Infrared Sounder (CrIS) mission.

We generated a Multi-year Monthly Mean and Anomaly product using 14 years of AIRS standard monthly product. The product includes Air Temperature at the Surface and Surface Skin Temperature, both in Ascending/Daytime and Descending/Nighttime mode. The temperature variables and their anomalies are deployed to Giovanni, a Web-based application developed by the GES DISC. Giovanni provides a simple and intuitive way to visualize, analyze, and access vast amounts of Earth science remote sensing data without having to download the data. It is also a powerful tool that stakeholders can use for decision support in planning and preparing for increased climate variability. In this presentation, we demonstrate the functions in Giovanni with use cases employing AIRS Multi-year Monthly Mean and Anomaly variables.

Generation of AIRS Multi-year Monthly Mean Surface Temperature and Anomaly

- Multi-year Monthly Mean (AIRGX3STM): 14-year (09/2002 to 08/2016) arithmetic mean of surface air and skin temperature from the AIRS monthly standard retrieval product (AIRX3STM).
- Anomaly (AIRGX3STMM): The difference between a selected month and the multi-year monthly mean of that month, generated dynamically by http service.

Multi-year Monthly Mean Surface Temperature and Anomaly In Giovanni User Interface

- AIRGX3STM
- AIRGX3STMM

NLDAS and SeaWiFS Climatology in Giovanni

- North American Land Data Assimilation Systems (NLDAS) model: temperature, moisture, humidity, rainfall, snow, wind, runoff, radiation, heat flux, albedo, evaporation, vegetation
- SeaWiFS: Aerosol Optical Depth

Surface Air Temperature Anomaly in January 2016 and July 2016

- January 2016: anomalously high air temperature
- July 2016: anomalously low air temperature

Use Case of Multi-year Monthly Mean Surface Temperature and Anomaly

2009-2010 and 2015-2016 El Niño events: Time-series plots of the sea surface temperature anomaly over the tropical central and eastern Pacific Ocean show remarkably warmer water during these two El Niño events. The fast transition of the 2009-2010 El Niño to La Niña is also indicated by the time-series plots of the anomaly, with a rapid shift from positive to negative.

Summary

- AIRS 14-year mean surface temperature and anomaly have been created and are available in Giovanni.
- Use cases with these variables demonstrate the potential for regional and global climate variation studies and El Niño event analysis.
- Stakeholders can use Giovanni for decision support in planning and preparing for climate change variability.

Contact Information

Feng Ding: feng.ding@nasa.gov
GES DISC Help Desk: gsfc-help-disc@lists.nasa.gov

Application of Shapefiles in Giovanni

- Countries
- Land/Sea
- US States
- Watersheds