Integrating Remote Sensing and Other Products into Decision Support Systems of United Nations World Food Programme

http://daac.gsfc.nasa.gov/agriculture/index.shtml

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Introduction

Set-up in 1963, the World Food Programme (WFP) is the United Nations frontline agency in the fight against global hunger. WFP depends on donors worldwide. The United States of America has been the largest donor. Natural disasters, such as, floods and droughts, occur every year in third world countries and emergency food aids are often required. Moving large quantities of foods over a long distance is not an easy task. Time and planning are required. Accurate and timely environmental information will facilitate decision-making, food distribution and maximize the use of contributions.

This presentation will describe our collaborative work with the World Food Programme of the United Nations, including web-based information services and tools to address global and regional water related issues, such as, floods and droughts.

More than 800 million hungry people in the world. WFP is the United Nations frontline agency in the fight against hunger.
Source: www.wfp.org

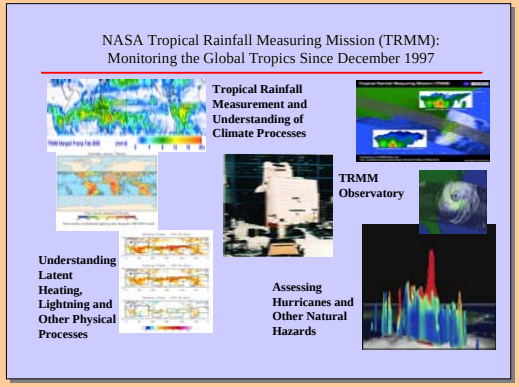
Products, Tools and Services

Few observational data are available for disaster monitoring in remote and poor third world countries. Satellite remote sensing observations provide a unique way in providing such data from space.

The NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) and Dr. Lenard Milich of WFP have been collaborating for the past three years on ways to integrate Tropical Rainfall Measuring Mission (TRMM) data into forward planning exercises for establishing geographic areas (e.g., sub-equatorial Africa, Indonesia, and North Korea) in need of food assistance. To monitor and assess current conditions, the GES DISC are developing a number of rainfall products derived from TRMM and online based tools to facilitate data and information access. These data and tools will not only benefit the WFP decision-making activities, but also other local agencies and the general public. All data and services are web-based to minimize the cost for data accessing and maximize the use of global rainfall data products.

Table 1 lists the products currently used in supporting the WFP operation. Accessing these products can be a challenging task to many non data experts. For example, all these products require different software for processing, which could require a significant investment from the user side. To overcome this difficulty and facilitate data access, the GES DISC has developed a web based system, TRMM Online Visualization and Analysis System (TOVAS). Based upon TOVAS and additional requirements for agriculture practices, the GES DISC is developing an Agriculture Information System (AIS). In addition to rainfall products, AIS will include other agriculture-related global remote sensing and in-situ datasets.

In addition to the data and tools described above, the GES DISC also provides customized services to WFP, including crop yield estimate using simple formulas, customized plots and analysis for reports, data product assessment for biases and uncertainty, development of simple methods to address coastal issues, development of new and efficient methods for monitoring activities and post season evaluation/summary. Feedback and comments from the collaboration have been used to further improve/enhance AIS.

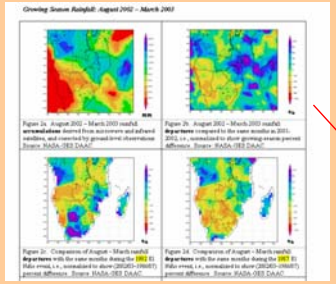


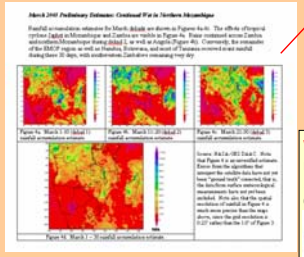
The Tropical Rainfall Measuring Mission (TRMM) is a join mission between NASA and the Japan Aerospace Exploration Agency (JAXA) designed to monitor and study tropical rainfall. The GES DISC archives and distributes TRMM data. For more information, visit: http://trmm.gsfc.nasa.gov and http://daac.gsfc.nasa.gov

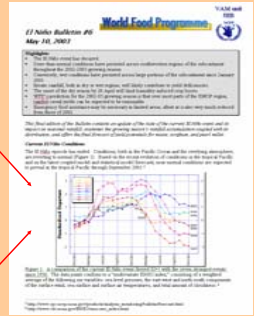
Product	Description	Usage
3B42RT	Near-real-time, 3-hourly, 0.25 deg., 60°S-60°N, multi-satellite precipitation analysis. Feb. 2002 - present	Derived products (e.g., daily, 10-day, etc.), Flood/drought monitoring
TRMM 3B43	Monthly, 0.25 deg., 50°S-50°N, TRMM and other data sources rainfall estimate. Jan. 1998 - present	Drought monitoring and crop yield estimate, derived rainfall climatology and anomaly
Willmott and Matsuura	Monthly, 0.5 deg., global land, gauge rainfall estimate. Jan 1950 - Dec. 1999	Derived rainfall climatology and anomaly

Table 1. Products used in supporting WFP worldwide operations

Samples of Products, Services and Remaining Issues

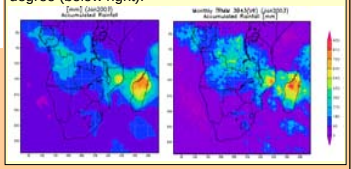






Sample plots (left) that were used in the WFP's El Nino Bulletins during the 2002-2003 growing season. The plots were generated either from TOVAS, or through customized services.

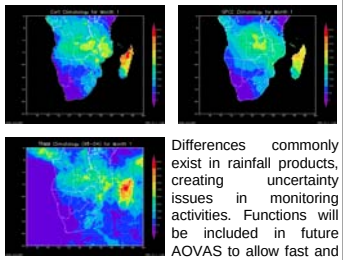
What's New? The spatial resolution of V6 TRMM monthly and 3-hourly products has increased from 1 degree (e.g., the monthly 3B43,below left) to 0.25 degree (below right).



Remaining Issues and Future Work

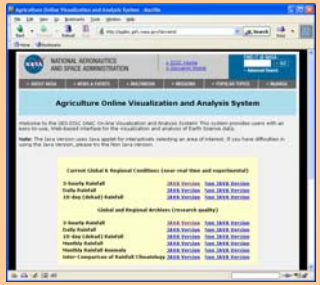
The feedback from the 2002-2003 season shows there are still some issues in the NASA products we provided, such as, uncertainty in rainfall measurement, making drought monitoring and forward planning difficult if it remains unsolved. The current and future tasks are:

- Summarize activities during the 2002-2003 season
- Expand the online tools by including local and regional rainfall surplus/deficit
- Expand the online tools by revealing uncertainties in near-real-time and climatological/baseline products to better estimate rainfall for flood/drought monitoring and anomalies
- Derive climatological information for coastal zones
- Derive ENSO rainfall products to understand changes during ENSO events



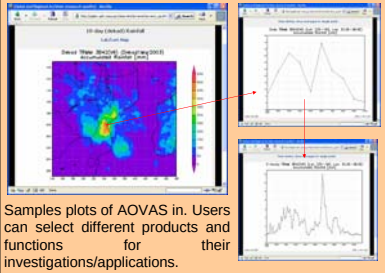
Differences commonly exist in rainfall products, creating uncertainty issues in monitoring activities. Functions will be included in future AOVAS to allow fast and easy identification of these uncertainties.

Agriculture Online Visualization and Analysis System



Agriculture Online Visualization and Analysis System (AOVAS), provides a simple and easy way to access agriculture-related data products with a web browser and few mouse clicks. The front page of AOVAS is shown above.

A sample (above) of AOVAS interfaces. AOVAS allows to generate maps, time series, Hovmoller diagrams, etc. Users can also obtain ASCII data for additional analyses. Spatial and temporal averages are also allowed.



Samples plots of AOVAS in. Users can select different products and functions for their investigations/applications.

Agriculture Project Portal: http://daac.gsfc.nasa.gov/agriculture/index.shtml
AOVAS: http://agdisc.gsfc.nasa.gov/Giovanni/
TOVAS: http://lake.nascom.nasa.gov/tovas/
TRMM Products: http://lake.nascom.nasa.gov/data/dataset/TRMM/
Details about TRMM: http://trmm.gsfc.nasa.gov
Questions and comments: hydrology@daac.gsfc.nasa.gov

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