TRMM Precipitation Application Examples Using Data Services at NASA GES DISC

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Abstract

Data services to support precipitation applications are important for maximizing the NASA TRMM (Tropical Rainfall Measuring Mission) and the future GPM (Global Precipitation Mission) mission's societal benefits. TRMM Application examples using data services at the NASA GES DISC, including samples from users around the world will be presented in this poster.

Precipitation applications often require near-real-time support. The GES DISC provides such support through: 1) Providing near-real-time precipitation products through TOVAS; 2) Maps of current conditions for monitoring precipitation and its anomaly around the world; 3) A user friendly tool (TOVAS) to analyze and visualize near-real-time and historical precipitation products; and 4) The GES DISC Hurricane Portal that provides near-real-time monitoring services for the Atlantic basin.

Since the launch of TRMM, the GES DISC has developed data services to support precipitation applications around the world. In addition to the near-real-time services, other services include: 1) User friendly TRMM Online Visualization and Analysis System (TOVAS; URL: http://disc2.nascom.nasa.gov/Giovanni/tovas/); 2) Mirador (http://mirador.gsfc.nasa.gov/), a simplified interface for searching, browsing, and ordering Earth science data at GES DISC. Mirador is designed to be fast and easy to learn; 3) Data via OPeNDAP (http://disc.sci.gsfc.nasa.gov/services/opendap/). The OPeNDAP provides remote access to individual variables within datasets in a form usable by many tools, such as IDV, McIDAS-V, Panoply, Ferret and GrADS; and 4) The Open Geospatial Consortium (OGC) Web Map Service (WMS) (http://disc.sci.gsfc.nasa.gov/services/wxs_ogc.shtml). The WMS is an interface that allows the use of data and enables clients to build customized maps with data coming from a different network.

Data Services at GES DISC to Support TRMM Precipitation Applications

Service	Description
Mirador	Mirador (from Spanish, *a place providing a wide view*) is a Google-based data archive search interface that allows searching, browsing, subsetting, format conversion, and ordering of Earth science data at NASA GES DISC.
TOVAS	TRMM Online Visualization and Analysis System: A member of The GES-DISC Interactive Online Visualization ANd aNalysis Infrastructure (Giovanni) is the underlying infrastructure for a growing family of Web interfaces that allows users to analyze gridded data interactively online without having to download any data.
TRMM read software	Read in a TRMM HDF data file, and write out user-selected SDS arrays and Vdata tables as separate flat binary files.
Simple Subset Wizard	A simple spatial subset tool to allow spatial subsetting and outputs are in NetCDF or ASCII.
REVERB	Refine your granule search with the NASA-developed Earth Observing System (EOS) Clearinghouse (ECHO) next generation Earth Science discovery tool
GrADS Data Server	a stable, secure data server that provides subsetting and analysis services across the internet. The core of the GDS is OPeNDAP (also known as DODS), a software framework used for data networking that makes local data accessible to remote locations.
OPeNDAP	The Open Source Project for a Network Data Access Protocol (OPeNDAP) provides remote access to individual variables within datasets in a form usable by many tools, such as IDV, McIDAS-V, Panoply, Ferret and GrADS.
OGC Web Map Service	The Open Geospatial Consortium (OGC) Web Map Service (WMS) is a service that provides map depictions over the network via a standard protocol, enabling clients to build customized maps based on data coming from a variety of distributed sources.

Precipitation Data And Information Services Center (PDISC) at the Goddard Earth Sciences (GES) DISC
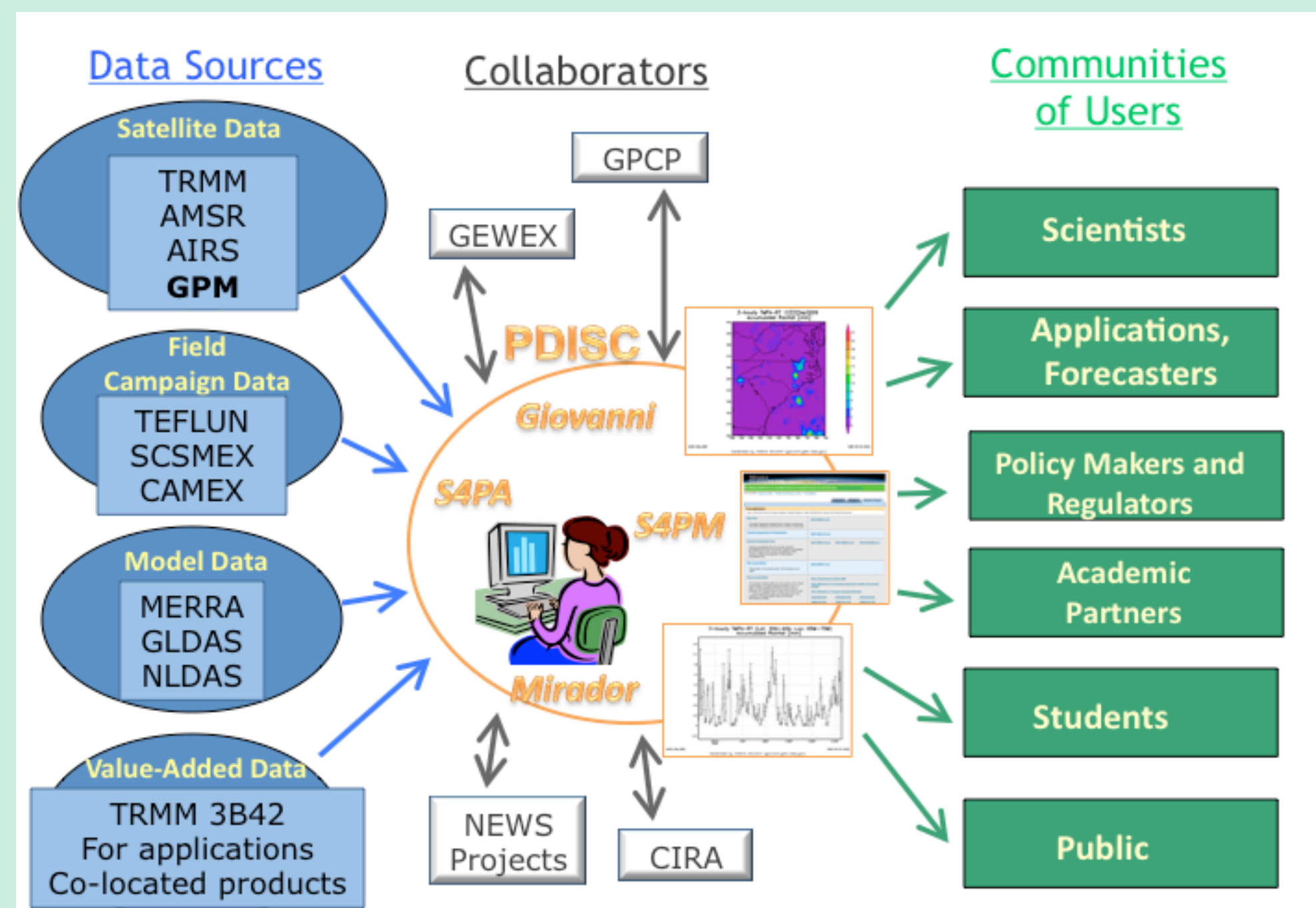

Agriculture

Improving World Agricultural Supply and Demand Estimates by Integrating NASA Data and Technologies into USDA World Agricultural Outlook Board Decision Making Environment
NASA ROSES NNH08ZDA001N-DECISIONS

Historical analog year comparisons for crop yield forecasts (Parana, Brazil; soybeans)

WMO station precipitation   TRMM 3B42-V6 precipitation
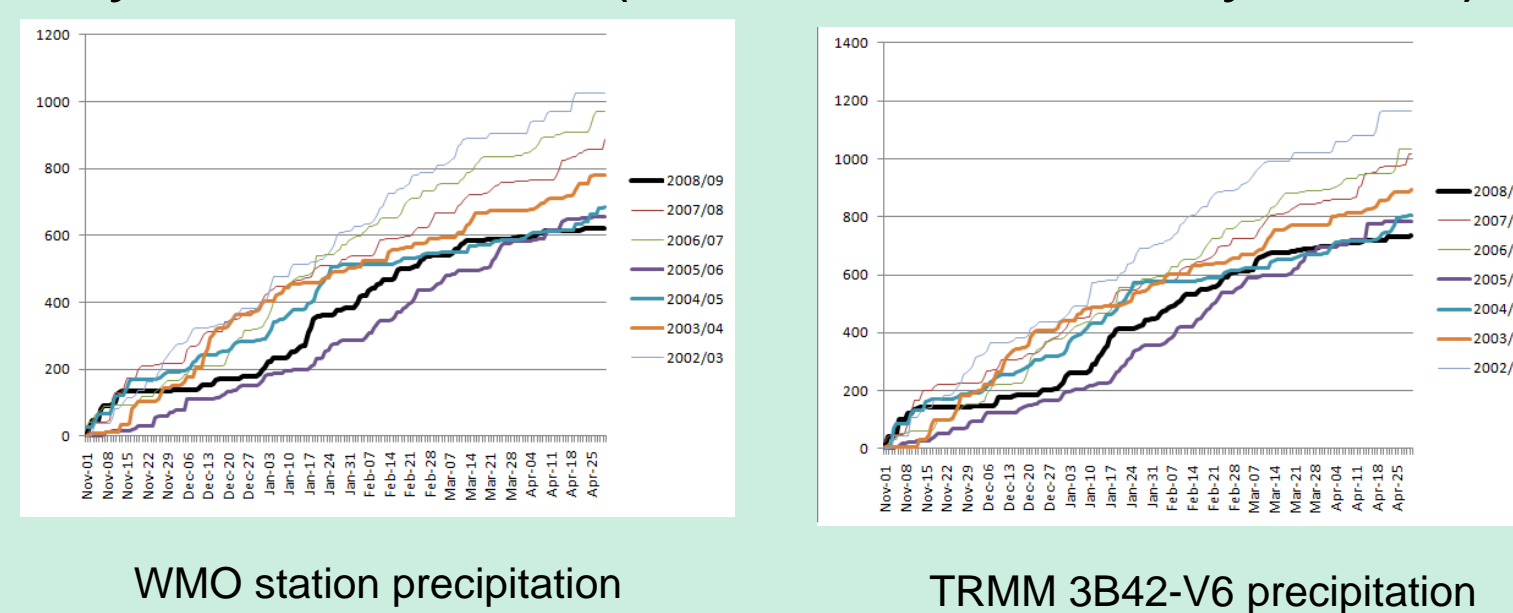
- WMO station and TRMM 3B42-V6 precipitation data both resulted in the same analog year (2004-05) for the target year of (2008-09).
- Complementary nature of satellite and weather station data, in identifying analog years, implies the possibility of "calibrating" the analog analysis methodology in station-rich areas, to be then applied in station-poor areas of the world.

NASA TRMM Precipitation Data for Monitoring Crop Conditions
http://daac.gsfc.nasa.gov/agriculture/ (Funded by NASA's REASoN CAN-02-OES-01)

10 Day Precipitation required for the USDA Foreign Agricultural Service (FAS) Crop Explorer
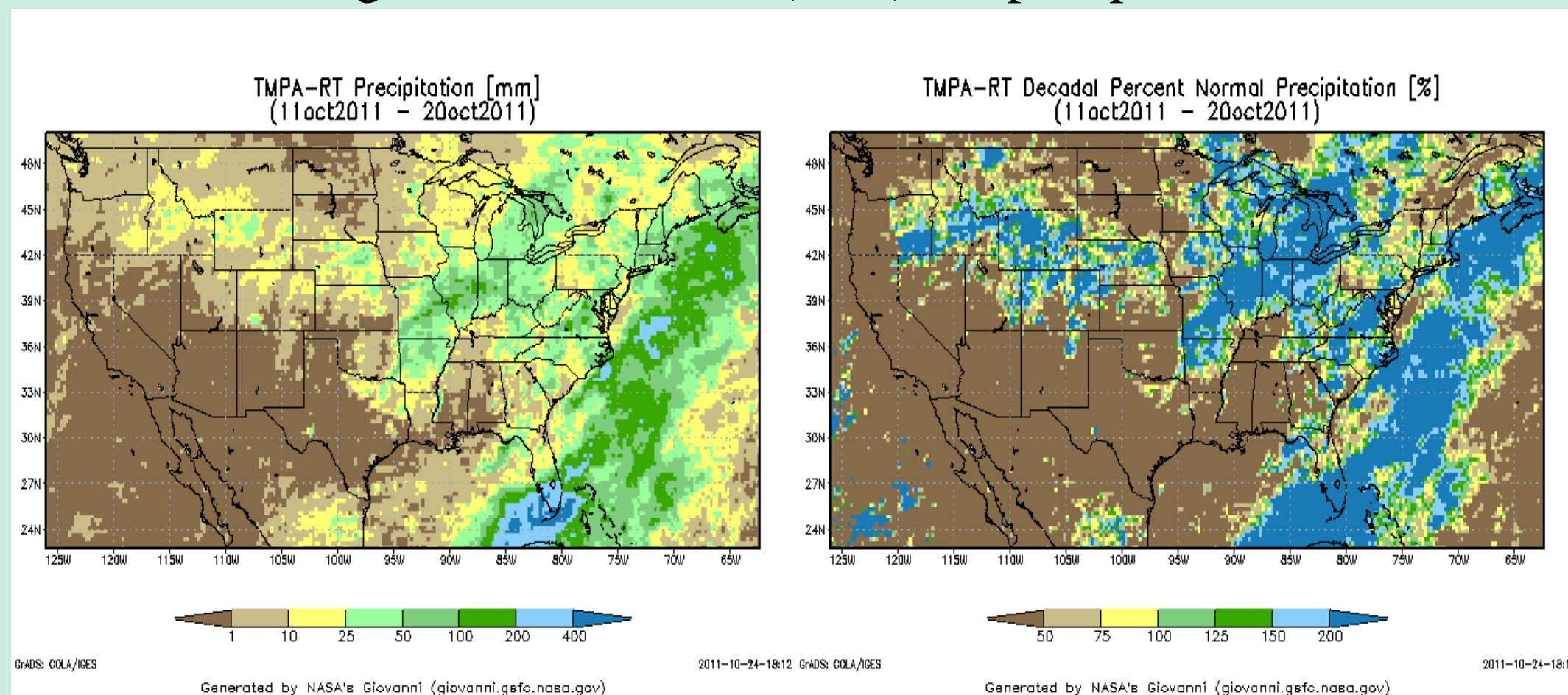
TRMM Applications (from user queries)

	User location
Health related	
NASA DEVELOP project with Mobile County Health Department examining specific parameters that West Nile/Encephalitis vectors and their larvae require. Interested in rainfall amount.	Alabama
Work on malaria mosquitoes in Asia. Interested in daily accumulated rainfall (3B42-V6).	Belgium
Monitoring weather in NE Kenya for disease outbreaks; comparing rain gauge data and TRMM. Interested in 3B42-V6.	Kenya
Work on possible implications of climate change on enhancement of schistosoma mansoni transmission in humans in the Dhofar region of Sultanate of Oman. Interested in monthly rainfall.	France
Disaster, Flood-related	
Hydrological studies of damaged bridges in Pakistan during floods of July-September 2010.	Pakistan
Creating maps and information graphics in response to complex emergencies and natural disasters. Interested in identifying a good rainfall anomaly data set (monthly and annually).	Central Africa
Using TRMM data for Early Warning System for floods in near real time. Interested in 3B42RT.	Italy
Disaster, Landslide-related	
Academic project on "RAINFALL THRESHOLDING FOR LANDSLIDES in Himachal Pradesh, India"	India
Process studies (general, regional)	
Studying Mag-Asawang Tubig Watershed, Mindoro, Philippines.	Phillipines
Studying spatial and temporal distribution of precipitation over Samar Island, Philippines. Interested in TRMM 3B42.	Philippines
Estimating rainfall of typhoon over ocean by using TRMM satellite data.	Taiwan
Using TRMM data for typhoon studies.	China
Project involving storm modeling for the Pacific.	Idaho
Usding hydrometeor profile to validate Weather Research and Forecasting model simulation.	India
Using 2A23 product to analyze convective and stratified rain types.	Florida
Using 3B42 products to study variability of extremes over Western India.	India
Using 3B42 three hour data to study rainfall at Andean basin, especially where Bolivia is located.	Bolivia
Working with TRMM 2A23 data to study convective-stratiform structure over Indian region.	India
Using 2A12 data (latent heat profiles) to study monsoon depressions.	India
Using TRMM 3B42 RT product to observe tropical rainfall patterns associated with convectively-coupled equatorial waves.	New York
Investigating rainfall across South Australia.	Australia
Studying monthly rainfall of January 1998 by inverse distance method of Pangani river basin, Tanzania.	Netherlands
Would like to validate 3B42 data for Nepal region in central Himalaya.	Nepal
Looking for TRMM satellite rainfall data for Jeddah, Saudi Arabia.	Pennsylvania
Agriculture-related	
Planning to use combination of monthly Willmot and Matsuura data, monthly TRMM (3B43 V6), and daily global rainfall (3B42RT) for historical analog analysis for crop yield forecasting in PR China.	
Human geography	
Analyzing how rainfall affects investments in childrens' education in Uganda. Interested in monthly rainfall data.	Italy
World Bank project on welfare dynamics and risk in Nicaragua. Using TOVAS (3A25V6) to complement "household survey data."	Nicaragua
Studying impact of urbanization on land surface temperature and heat fluxes. Interested in TRMM VIRS data.	India
Interested in daily rainfall patterns and how they affect price of latex.	Georgia
Working with rainwater harvesting systems; gauge data are hard to come by, so trying to access TRMM satellite data.	Uganda
Misc.	
Gathering data for an ecological reserve located just outside Chico, CA.	California
Some study for UNESCO-IHE. Interested in daily TRMM (3B42 V6 derived) data.	China
Studying possible effects of Galactic Cosmic Rays on tropical and overall climate, precipitation amount, and cloud cover.	India
Gathering information on the different types of applications of satellite precipitation estimates.	France