The Issues

One of the biggest obstacles for the average Earth science student today is locating and obtaining satellite-based remote sensing datasets in a format that is accessible and optimal for their data analysis needs. At the Goddard Earth Sciences Data and Information Services Center (GES-DISC) alone, on the order of hundreds of Terabytes of data are available for distribution to scientists, students, and the general public. The single biggest and time-consuming hurdle for most students when they begin their study of the various datasets is how to slog through this mountain of data to arrive at a properly sub-setted and manageable dataset to answer their science question(s). The GES-DISC provides a number of tools for data access and visualization, including the Google-like Mirador search engine and the powerful GES-DISC Interactive Online Visualization And aNalysiS Infrastructure (Giovanni) web interface.

http://Giovanni.gsfc.nasa.gov

Giovanni provides a simple way to visualize, analyze and access vast amounts of satellite-based Earth science data. Giovanni is actually a series of twenty-one similar web-based data interfaces, each of which covers a single satellite dataset (such as TRMM, TOMS, OMI, AIRS, MLS, HALOE, etc.) or a group of related datasets (such as MODIS and MISR for aerosols, SeaWIFS and MODIS for ocean color, and the suite of A-Train observations co-located along the CloudSat orbital path). Recently, ground-based datasets have been included in Giovanni, including the Northern Eurasian Earth Science Partnership Initiative (NEESPI) and EPA fine particulate matter (PM$_{2.5}$) for air quality (US only). Model data, such as the Goddard GOCART model and MERRA meteorological reanalyses, are being incorporated into Giovanni to facilitate model-data intercomparison. A full suite of data analysis and visualization tools is also available within Giovanni.

How does the student, who starts with a science question, get from here to here?

Sample Science Question:

How can we find out how rainfall has changed over the Eastern US over the past decade?

NASA's Tropical Rainfall Measuring Mission satellite makes regular observations of total rainfall and rainfall rates over a broad range in the tropical and subtropical regions of the Earth. Graphical satellite images were observed. Satellite observations of the monthly rainfall anomaly in 2001 over the U.S. tropical region show an increase of over two inches above normal.