The Giovanni News
October/November 2013
GODDARD EARTH SCIENCES DATA & INFORMATION SERVICES CENTER (GES DISC)

From the Editors

Back in July of this year, we decided to switch The Giovanni News to a monthly format. That was working out pretty well until October, when we had to take a couple of weeks off unexpectedly. (You probably heard about that.) So, this issue is a 'combined' October-November issue, but we'll still have two more this year: (1) The annual American Geophysical Union Fall Meeting issue, where we highlight the presentations related to Giovanni that will be given by our GES DISC staff at the meeting and (2) the upcoming Giovanni Image Hall of Fame issue, with our inaugural "class" of the first ten outstanding images.

There are some events and possible happenings related to Giovanni that you might find of interest. As part of a television documentary about education, California students were filmed using Giovanni, so it might get its small screen debut. Images created with Giovanni were featured on the Earthdata Web site (http://earthdata.nasa.gov) as "DAAC Image of the Week," showing the air quality crisis in northern China that occurred late in October. The National Fisheries Institute of Mexico is planning to routinely summarize the oceanic environment of the country, in a monthly bulletin that includes ocean imagery generated with Giovanni. And tornado chaser extraordinaire, Reed Timmer, started following us on Twitter after seeing Giovanni imagery of Hurricane Isaac! (@nasa_gesdisc and @nasa_giovanni)

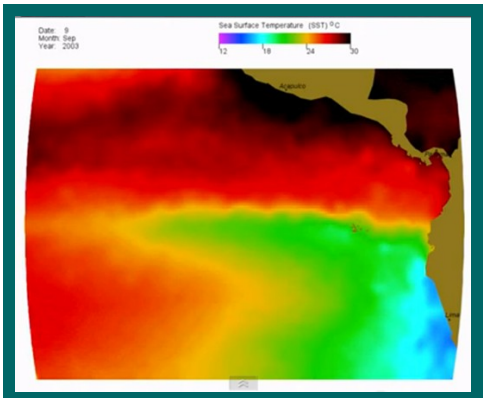
This month, we have an article about one of the more interesting uses of Giovanni we've ever seen (complete with musical accompaniment); a look at Super Typhoon Haiyan; and a Giovanni-4 development update.

Have fun!

Jim Acker and Wainie Youn

Research Highlight: Galapagos indicator of El Niño using monthly SST from NASA Giovanni System

Alexander O. Tarakanov and Alla V. Borisova
Published in Environmental Modelling and Software, 50, pp. 12-13 (2013)



A single day from the SST animation of the Pacific Ocean by Tarakanov and Borisova (2013). The day shown is September 9, 2003. Cold upwelled waters off Peru and very warm coastal waters off the coast of Mexico are noteworthy, as well as the distinctive signature of the Equatorial Pacific Upwelling Zone extending to the west of the Galapagos Islands.

In this short communication, Tarakanov and Borisova described how the Most Anomalous Indicator (MAI) method, as applied to the Moderate Resolution Imaging Spectroradiometer (MODIS) sea surface temperature (SST) data, downloaded from Giovanni, demonstrated a high correlation with the El Niño–Southern Oscillation (ENSO) state of the Pacific Ocean. The selected MAI was located *at just a single point* in the ocean off of the island of Isabela in the Galapagos Islands – a point named the "Galapagos Indicator." Tarakanov and his colleagues used a model that interpolates SST between observations, and then they applied rigorous statistical methods to analyze the data. According to the paper, the MAI is defined as "a geographical point where some function of SST anomaly is greater than that in any other point within the area."

The results of using the Galapagos Indicator with MODIS SST from Giovanni indicated the same El Niño peaks and La Niña valleys as those in the National Oceanic and Atmospheric Administration (NOAA) ENSO indices Niño 3.4, Niño 1 & 2, and the Southern Oscillation Index (SOI). There was a better match with the Niño 1 & 2 than with the Niño 3.4 index, though the only difference was that the Niño 3.4 index did not show an El Niño event in August 2008, while the Niño 1 & 2 did, as did also the Galapagos Indicator. Tarakanov and Borisova suggested that the MAI method could be applied to other areas of the ocean and in lakes, and that the cycles of the MAI in these bodies of water could be compared to the Galapagos Indicator.

If you think that you have heard of Alexander Tarakanov before, you might be right. One of his first videos of SST in the Caspian Sea was featured in a back issue of The Giovanni News. To demonstrate the results from the SST model, he has created several other animated videos of oceanic regions and posted them to YouTube, set to music. You can find them here, interspersed among other videos related to his favorite activity, free-diving in the ocean. The Pacific Ocean SST simulation is can be viewed here. The musical piece accompanying this animation is "Вечный странник" by Дидюля ("Eternal Wanderer" by Didula).

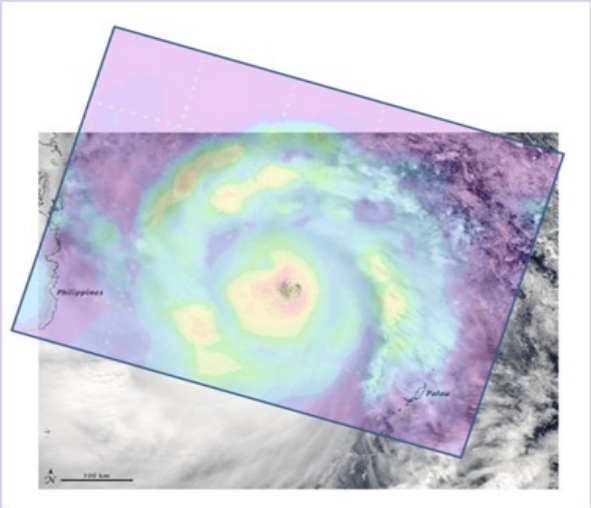
In this Issue

Research Highlight: Galapagos indicator of El Niño using monthly SST from NASA Giovanni System.

Giovanni Image of the Month: Overlay of Tropical Rainfall Measuring Mission (TRMM) Multi-satellite Precipitation Analysis – Real Time (TMPA-RT) Precipitation Data on a MODIS true-color image of Super Typhoon Haiyan.

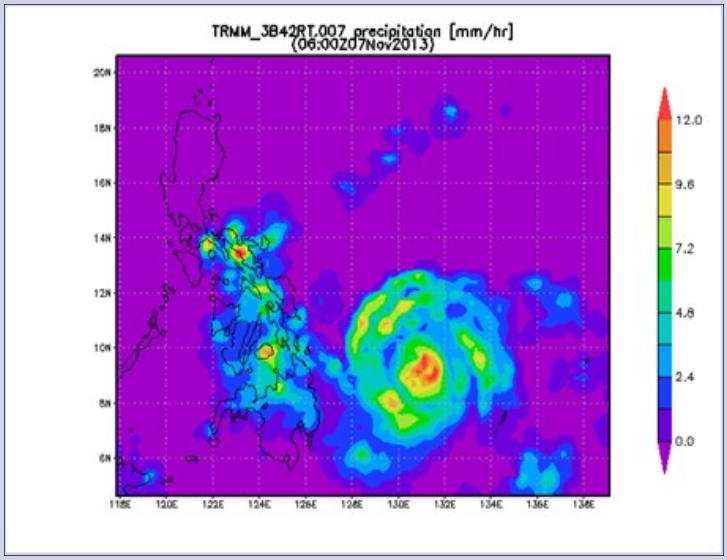
Giovanni-4 Development Update

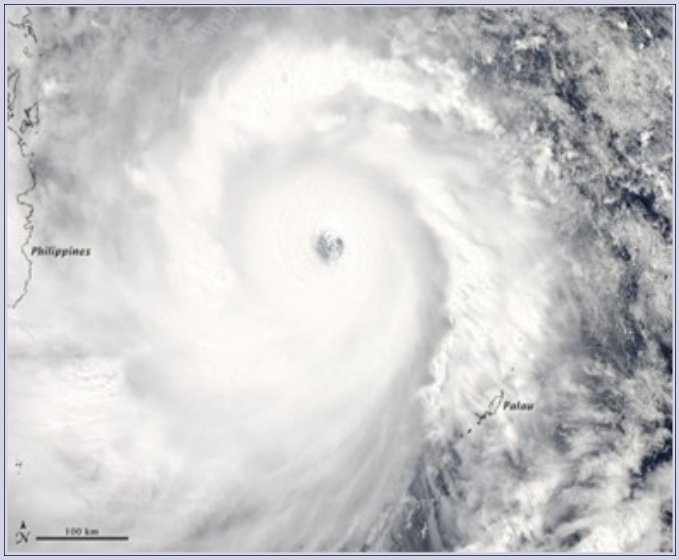
Overlay of Tropical Rainfall Measuring Mission (TRMM) Multi-satellite Precipitation Analysis - Real Time (TMPA-RT) Precipitation Data on a MODIS true-color image of Super Typhoon Haiyan.



This overlay image of TMPA-RT precipitation data with a true-color MODIS-Aqua image of Super Typhoon Haiyan was created with MS Powerpoint. Both the image and the data were acquired on November 7, just a few hours before Haiyan made landfall in the central Philippines. The TMPA-RT data are generated every 3 hours, so there is some blurring of the storm features. However, Haiyan had such a large eye that it was distinctly visible in other TMPA-RT 3-hour images, when the storm's movement slowed. In this image, the strong rainfall around the eyewall is distinctly visible, as well as a good match of the precipitation pattern with the outer cloud bands circulating around the storm center. Although the geographical match is not exact, this image illustrates the potential synergy of different types of NASA remote sensing data for research on meteorological phenomena.

The overlay image was created with the following two images. The labeled MODIS-Aqua image was created by the NASA Earth Observatory.





Giovanni-4 Development Update

Edited from the Release Notes for Giovanni 4.4.

http://disc.sci.gsfc.nasa.gov/giovanni/documents/ag/release-notes-for-giovanni-4-beta

New in Giovanni 4.4

- *Interactive Map:* The **Map** plot type now shows the Interactive Map (replacing the old static Map).
- *Vector Data Grids:* The Map now displays arrows for vector data grids, which are used in plotting GSSTFM wind stress vectors, newly added to Giovanni.
- *Performance Improvements:* Both the request startup time and time to retrieve data from cache have been significantly reduced, resulting in faster response.

Newly available data variables

Heat Flux and Wind Stress magnitudes from GSSTFM

New for Giovanni-4 vs. Giovanni-3

- Interactive maps supporting zoom and pan
- Interactive linked scatterplot + map, both individual points and time-averaged grid points
- Vector grid maps, shown as arrows

New User Interface

The User Interface is being redesigned to be less opaque to new and occasional users. It also allows users to narrow down the number of variables for selection, either by selecting particular attributes ("faceted browsing") or filtering on keywords. However, experienced Giovanni users may see some "user interface shift shock." In some cases, certain things may seem more difficult or tedious to do than they were in Giovanni 3. Please tell us those things, with particular reference to how you used to do them in Giovanni 3!

In progress

Data from AIRS; seasonal data averaging; Vertical Profile display.