

Distribution and Tracking of NASA EOSDIS Data

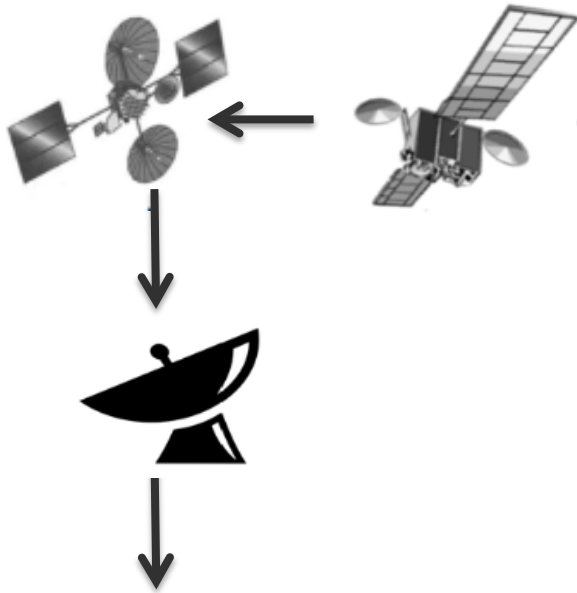
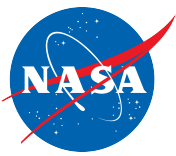
Towards mapping NASA's Earth Observation Value Chains



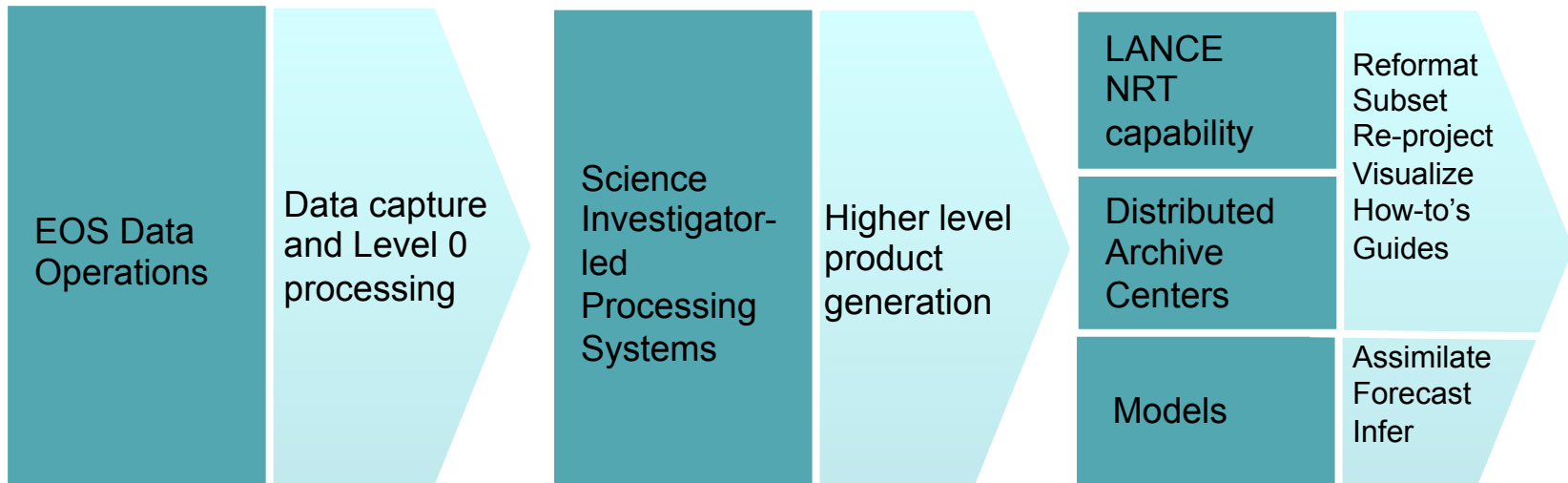
Diane Davies, Jeanne Behnke
NASA Goddard Space Flight Center/ESDIS Project
diane.k.davies@nasa.gov, jeanne.behnke@nasa.gov



NASA Earth Observation (EO) Data Products



- NASA Satellite missions are based on key science questions
- Once on orbit, the value of the mission is multiplied by the many possibilities afforded by the data – many of which were not part of the original justification for the mission
- The value is increased by every link in the chain.



EOSDIS Evolution: Worldview and Global Browse Imagery Services

GIBS / Worldview Goal:

To transform how users interact with and discover NASA Earth data; make it visual



Approach:

- The **Global Imagery Browse Services (GIBS)** provide open access to full resolution imagery derived from NASA products to any mapping client and script
<https://earthdata.nasa.gov/gibs>

- **Worldview** is an open source, browser-based client to interactively explore GIBS (and SEDAC) imagery and download the underlying data

<https://worldview.earthdata.nasa.gov>

Open-Access Servers

Client

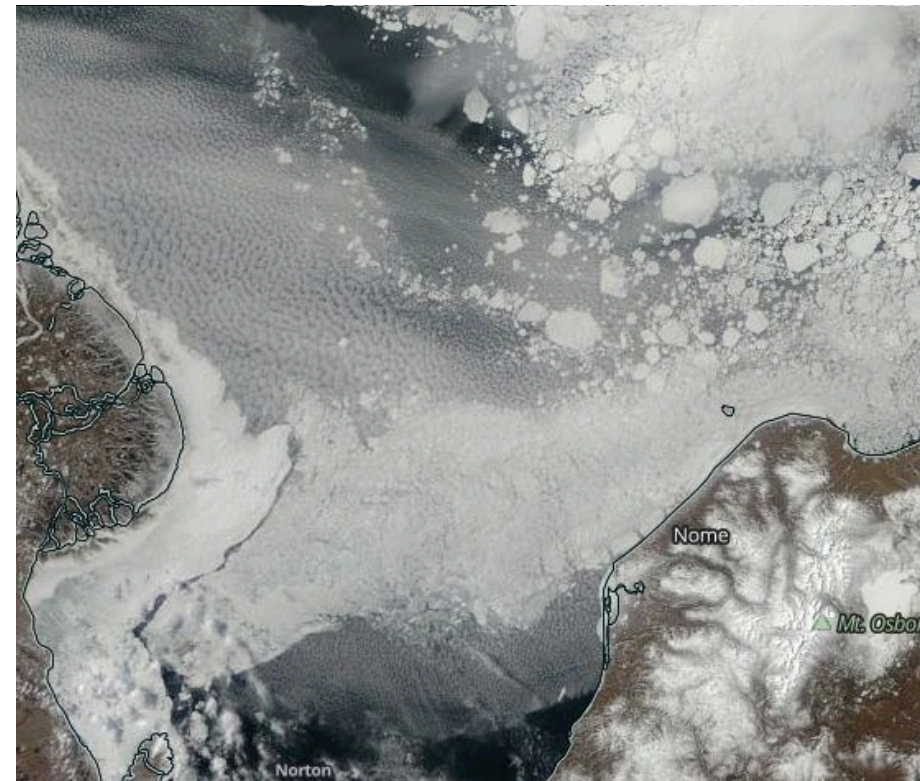
EOS Imagery Available

Global Imagery Browse Services (GIBS)

- Most imagery is available within 3-5 hours of observation
- Supported application areas include air quality, flood monitoring, wildfire management, shipping



Yosemite Rim Fire, 2013 August 20-24



Sea ice near Nome, AK, 2014 April 23-28

NASA's Fire Information for Resource Management System (FIRMS)

Value Added Services

- Fire Email Alerts
- Visualize imagery
- GIS compatible data



Data processing at SIPS in NRT (LANCE)



NASA FIRMS Email Alert

634 fires detected over the past 24 hours.
(Coordinates: 102.83,-40.78,164.36,-10.02)

[View image on FIRMS Server »](#)

NOTE: Cloud cover might obscure active fire detections.
Please see the full disclaimer via the link below.

Questions, feedback, or comments? [Write to us!](#)

This email was generated on 2014-04-30, 20:04:23 UTC.

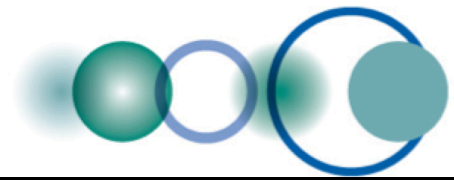
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- NASA FIRMS »
- Visit FIRMS Homepage
- View Your Subscriptions »
- FIRMS FAQ »
- FIRMS Web Fire Mapper »
- Download Archive Hotspots »
- NASA LANCE-MODIS »

End users adding value: Customized Email and SMS alerts, press releases



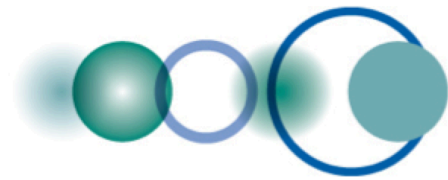


GEOGLAM Crop Monitor for AMIS

(Agricultural Market Information System)

- Endorsed by the G20 Heads of state, response to G-20 AMIS request
- The objective of the Crop Monitor is to provide an international and transparent multi-source, consensus assessment of crop growing conditions, status, and agro-climatic conditions, likely to impact global production
 - inputs from GEOGLAM Community of Practice, international and national agencies, based on evidence from near real time satellite, weather, agromet, and national expert assessments

Website: <http://www.geoglam-crop-monitor.org>



Crop Monitor Interface for Crop Condition Assessments

The interface features a top navigation bar with links: Dashboard, Map, Monthly Assessment, Archive, Settings, Partners, Admin, Dev, and Logout. The main map area displays a world map with various colored overlays representing crop conditions and stages. A legend in the bottom-left corner defines the color coding for NDVI Anomaly, Rainfall Sum Anomaly, Crop Stages, and Crop Condition.

Products

- Overlay #1: Select a Year (2015), Select a Product (NDVI Anomaly, March 28), Opacity: 0% to 100%
- Overlay #2: Enable, Select a Year (2015), Select a Product (Rainfall Sum Anomaly, March), Opacity: 0% to 100%

Crops

- Overlay #1: Select a Crop Mask (Winter Wheat), Select a Crop Calendar (March 15)
- Overlay #2: Select a Crop Mask (Winter Wheat), Select a Crop Calendar (March 15)

Crop Monitoring

- Select an Assessment Period (March 15 - April 14 (CURRENT))
- End Assessment

Legend

- NDVI Anomaly:** -0.4 (red) to 0.4 (dark green)
- Rainfall Sum Anomaly:** <-200 (red) to >200 (blue) mm
- Crop Stages:** Planting-Early Vegetative (light blue), Vegetative-Reproductive (purple), Ripening Through Harvest (yellow), Out of Season or N/A (grey)
- Crop Condition:** Exceptional (dark blue), Favorable (green), Watch (yellow), Poor (red)

East, Turkey

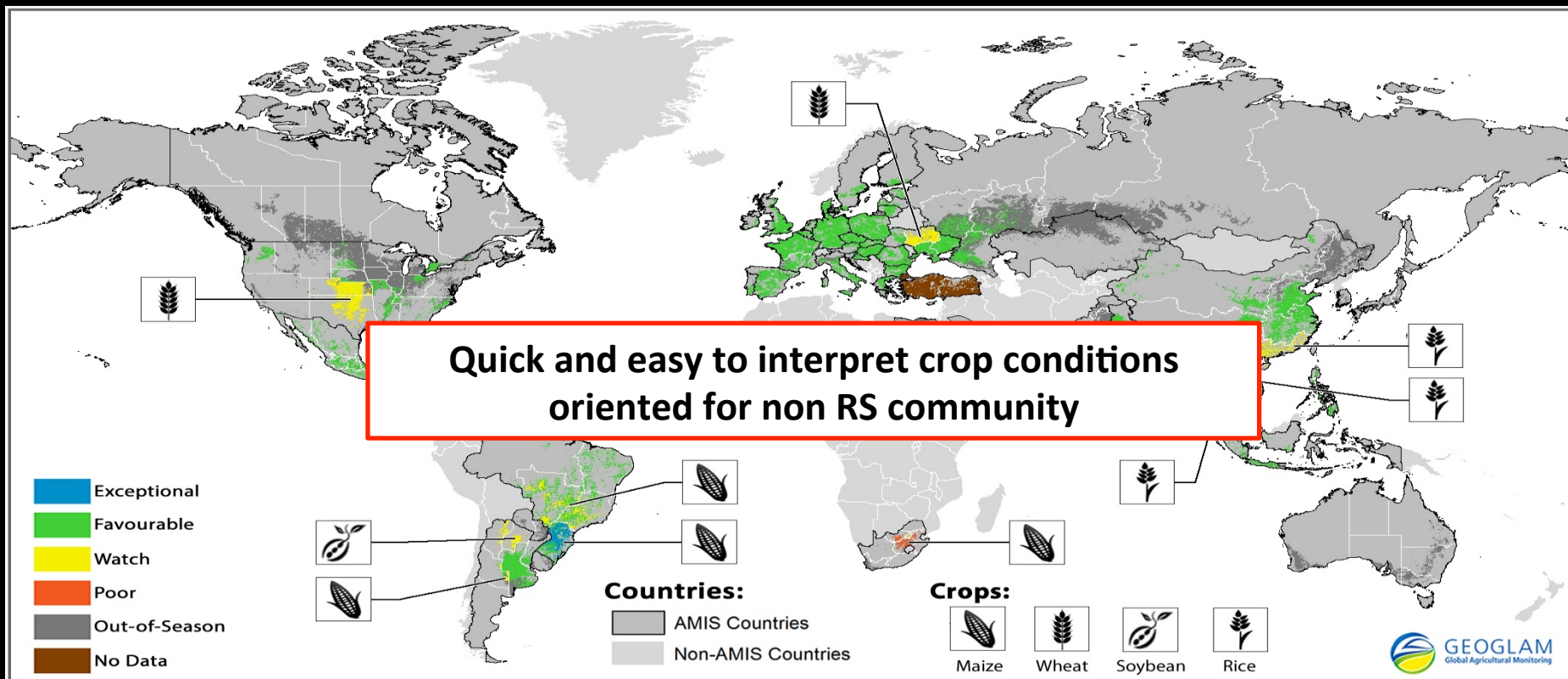
- Condition: Select A Condition
- Trend: Select A Trend
- Provenance: Select A Provenance
- Observed Date: [Calendar icon]
- Drivers:
 - Wet: Select Impact
 - Dry: Select Impact
 - Hot: Select Impact
 - Cold: Select Impact
 - Extreme Event: Select Impact
- Comments: [Text area]

Basemaps: Imagery, Imagery with Labels

UNIVERSITY OF MARYLAND

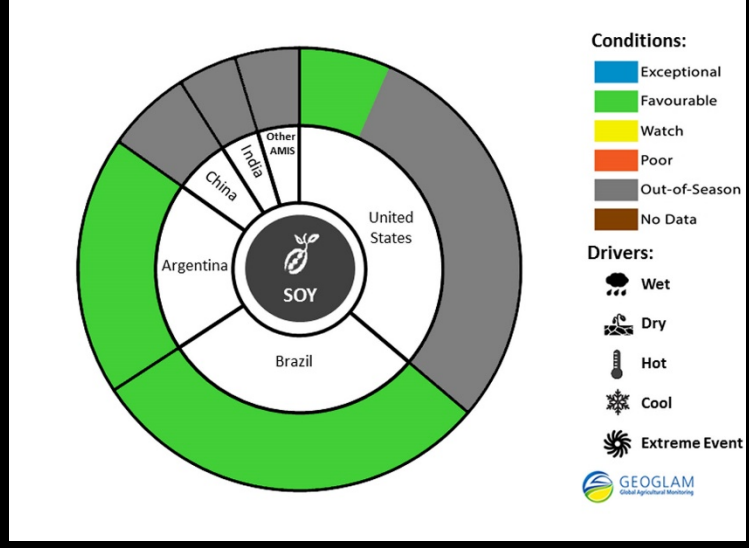
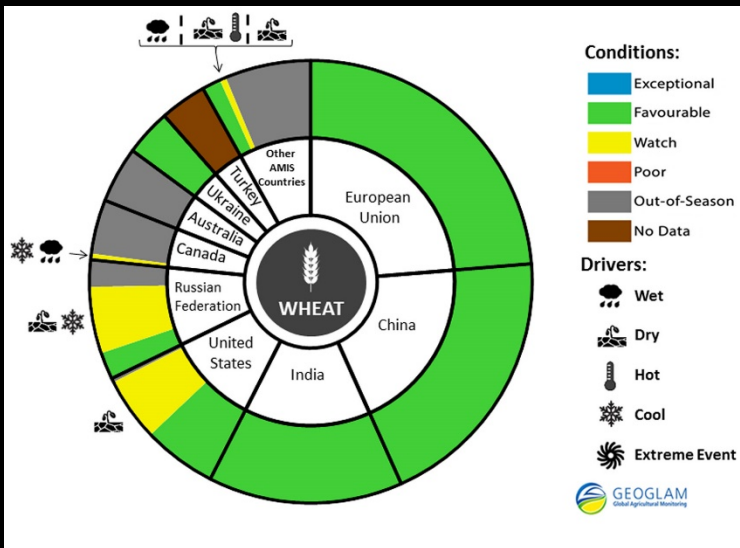
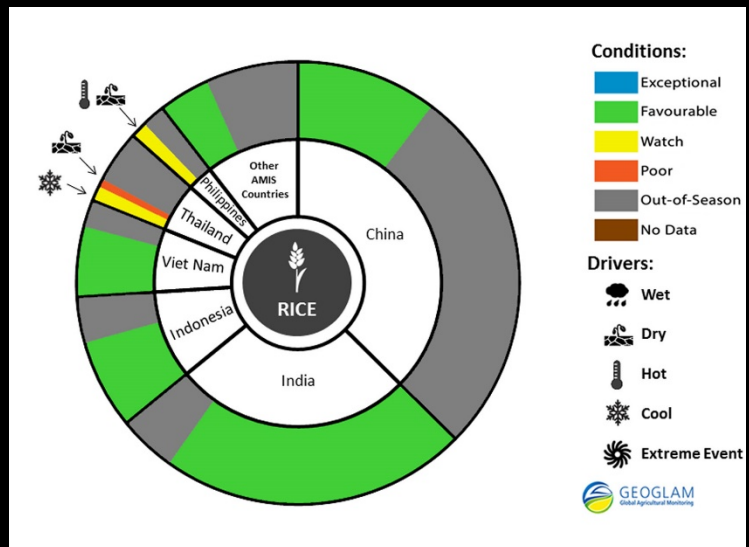
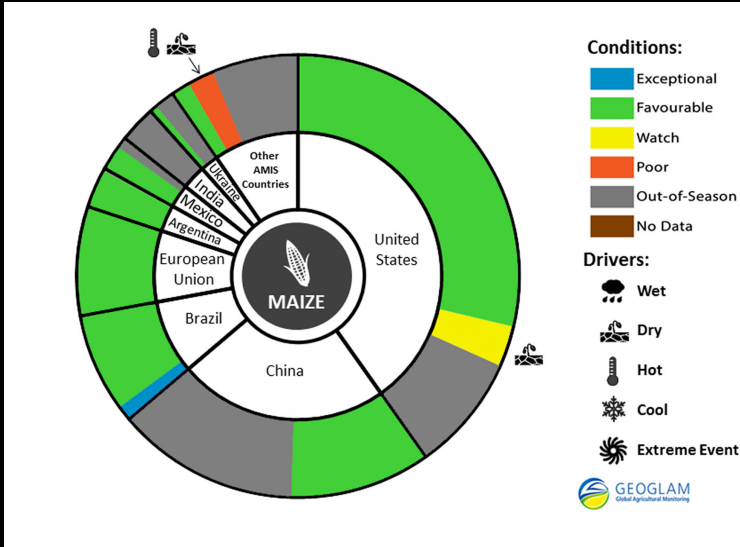
Condition Synthesis Maps Covering All AMIS Crops

Crop Conditions as of April 28th, 2015



Crop condition map synthesizing information for all four AMIS crops. **Crops that are in other than favorable conditions are displayed on the map with their crop symbol.** (Cropland area shown is an aggregation of all cropland areas)

Crop Condition Pie Charts by Crop



The Monthly Crop Monitor Monthly Bulletin

AMIS No. 22 – October 2014 2

Crop Monitor*

Crop Conditions in AMIS countries (as of September 28th)

Conditions:
 Exceptional
 Favourable
 Mixed
 Poor
 Out-of-Season
 No Data

Countries:
 AMIS Countries
 Non-AMIS Countries

Crops:
 Maize, Wheat, Soybean, Rice

Crop condition map synthesizing information for all 40 AMIS crops as of September 28th. Crop conditions over the main growing areas for wheat, maize, rice, and soybean are based on a combination of national and regional crop analyst reports along with earth observation data. Crops that are in other than favourable conditions are displayed on the map with their crop symbol.

Highlights

Wheat conditions remain mostly favourable. In the northern hemisphere, the spring wheat season is coming to a close and winter wheat planting has begun. In Kazakhstan, Russia, US and China spring wheat conditions remain generally favourable. In Canada, spring wheat conditions have deteriorated due to ongoing excess of moisture, cool conditions and frost damage. In the southern hemisphere, wheat is mostly in vegetative to reproductive stages. In Australia, conditions remain mixed and overall yield prospects are reduced. Slightly warmer temperatures and below normal precipitation exacerbated crop deterioration in southern growing regions. In contrast, recent rainfall across Western Australia and central Queensland benefited late planted crops. Timely rainfall will be critical for sustaining crops through to harvest. In South Africa, Brazil, and Argentina conditions remain favourable though there is still some concern due to excess rainfall in parts of Argentina.

Maize overall conditions remain favourable. In the northern hemisphere, conditions remain very good in the US and good in the EU owing to favourable weather. In China, concern remains due to earlier dry and hot weather. In Russia concern remains over the central region and in Ukraine conditions have improved. In Mexico conditions remain generally favourable. In the southern hemisphere, planting has begun and conditions are favourable in Brazil and Argentina.

Rice conditions remain favourable. In India, conditions are mostly favourable and the crop is in vegetative to reproductive stages. In Indonesia and Thailand conditions are favourable, however, some concern remains over excess moisture in Thailand. In China, conditions are favourable. However, there is some concern over excess moisture due to Typhoon Kalmegi. In Viet Nam, conditions are good however total planted area is down relative to last year.

Soybeans overall conditions are very good primarily owing to the US crop. In the northern hemisphere a record crop is expected in the US owing to good weather and increased area. In China, conditions are generally favourable though concern remains due to earlier dry conditions in parts of the northeastern growing region. In Canada, conditions remain mixed due to the ongoing cool and wet weather and recent frost events. In the southern hemisphere the planting season has begun in Brazil under favourable conditions.

El Niño situation update

Outlooks released in mid and late September by the Australian Bureau of Meteorology, the International Research Institute for Climate and Society, and the U.S. National Oceanic and Atmospheric Administration put the probability of an El Niño event during the 2014-2015 southern hemisphere growing season above 50%. Model projections suggest the event will not be a strong one. Potential impacts of El Niño should be considered nonetheless. These include below-normal rainfall in parts of Asia, Southern Africa, and Australia, potentially affecting rice, maize, and wheat. In major regions of South America, El Niño is often associated with above-average rainfall potentially benefiting maize, soy and wheat.

AMIS No. 22 – October 2014 3

Wheat Conditions for AMIS countries as of September 28th.

Conditions:
 Exceptional
 Favourable
 Mixed
 Poor
 Out-of-Season
 No Data

Delivers:
 Wheat, Soybean, Maize, Rice, Corn, Barley, Oats, Rye, Sorghum, Millet, Other Cereals

For detailed description of the pie chart please see box on page 4.

Wheat conditions in the northern hemisphere remain favourable. The spring wheat season is drawing to a close and winter wheat planting is in progress. In Russia, spring wheat prospects remain favourable as harvest is close to completion. Winter wheat planting is progressing well owing to favourable weather that boosted moisture conditions. In Ukraine, winter wheat planting has initiated under mostly favourable conditions. Recent precipitation helped to alleviate dry conditions, however dryness continued in southern regions. In Kazakhstan, spring wheat conditions remain overall favourable and harvest in the main wheat zone is in progress with reported yield slightly below average. In the EU, harvest is complete and overall yields remain favourable, slightly above the 5-year average. Winter wheat planting has started as normal. In the US, spring wheat conditions are overall favourable. Harvest is nearly complete after some delays in northern areas due to wet conditions. Planting of winter wheat is underway. In Canada, conditions have deteriorated. In the Prairies, dry conditions and frost in early September caused crop damage, though the full impact will not be known until harvest is complete. In addition the ongoing excess moisture and cool conditions continue to delay harvest by a couple of weeks. In eastern regions conditions were good and harvest was progressing normally until a mid September frost event. Impacts are still to be determined. In Argentina, conditions remain generally good, and the crop is in vegetative to reproductive stages. Concern remains due to excess moisture in south-western Buenos Aires region. In Brazil, weather conditions are favourable. Planted area increased relative to last year and an increase in production is likely. Sowing is concluded and the crop is mostly in reproductive to harvest stages. In Australia, conditions remain mixed and overall yield prospects are reduced. Slightly warmer temperatures and below normal precipitation exacerbated crop deterioration in southern growing regions where soil moisture deficits persisted since August. In contrast, recent rainfall across Western Australia and central Queensland benefited late planted crops. Timely rainfall will be critical for sustaining crops through to harvest. In South Africa conditions remain favourable over the winter rainfall region (main area) owing to normal to above-normal rainfall in winter, and yields are expected to be similar to last year. Over the summer rainfall region, below-normal rain since April resulted in reduced planted area.

Maize Conditions for AMIS countries as of September 28th.

Conditions:
 Exceptional
 Favourable
 Mixed
 Poor
 Out-of-Season
 No Data

Delivers:
 Maize, Wheat, Soybean, Rice, Corn, Barley, Oats, Rye, Sorghum, Millet, Other Cereals

For detailed description of the pie chart please see box on page 4.

Maize conditions in the northern hemisphere remain overall favourable. In the US, the crop will likely surpass both yield and production records in large part due to excellent and consistent summer conditions, particularly in the dominant Corn Belt region. In the EU, yield prospects of grain maize remain good despite limited local concerns due to excessive rainfall. In Russia, harvest is underway. Concern remains in the central region where yields are expected to be down relative to last year. In Ukraine, prospects improved for maize. Quality is expected to be average and harvest is progressing. In China, conditions remain mixed with concern across much of the North China Plain and Northeast growing regions due to earlier dry conditions. In south-western regions, maize harvest is mostly complete. In Mexico conditions remain generally favourable with sufficient moisture for crop development. Sowing of the spring-planted crop is complete. There is some concern over excess moisture in a few production areas in southern growing regions, but without considerable damage to production. In Canada, conditions remain mixed and harvest is underway. Wet weather remains a concern and is delaying harvest. In addition, there is some concern over the September frost events. In Nigeria, conditions improved and are favourable. In the southern hemisphere conditions are favourable. In Brazil weather conditions are favourable for sowing of the first crop. In Argentina, planting is progressing in Buenos Aires, Cordoba and Santa Fe and conditions are overall favourable for the emerging crops.

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Rice Conditions for AMIS countries as of September 28th.

Conditions:
 Exceptional
 Favourable
 Mixed
 Poor
 Out-of-Season
 No Data

Delivers:
 Rice, Wheat, Soybean, Maize, Corn, Barley, Oats, Rye, Sorghum, Millet, Other Cereals

For detailed description of the pie chart please see box below.

Rice conditions are generally favourable. In India, conditions are mostly favourable and the crop is in vegetative to reproductive stages. In Indonesia, the dry season crop conditions remain favourable. Rice growth stages range between vegetative to maturity stages depending on planting date. In Viet Nam, overall conditions of the summer, the summer-autumn, and autumn-winter crops are good. However, total planted area is lower relative to last year. Growth stages range from transplanting to harvest. In Thailand, overall conditions are favourable. Some concern remains over wet season rice in some provinces in the north and northeast due to heavy rainfall and some flooding. Overall planted area of wet season rice has decreased relative to last year in favour of other crops. In China, conditions remain generally favourable. However, there is some concern due to typhoon Kalmegi, which brought heavy rainstorms to southern growing regions. Single cropped rice is mostly in heading to harvest stages, while late season rice is in booting to flowering stages. In the EU, the rice crop is still progressing as normal. In the US, conditions are favourable and much of the crop has been harvested. In Nigeria, conditions are favourable. In the main producer state started the soil tillage in preparation for the next crop.

Soy Conditions for AMIS countries as of September 28th.

Conditions:
 Exceptional
 Favourable
 Mixed
 Poor
 Out-of-Season
 No Data

Delivers:
 Soybean, Wheat, Rice, Corn, Barley, Oats, Rye, Sorghum, Millet, Other Cereals

For detailed description of the pie chart please see box below.

Soybeans prospects in the northern hemisphere are overall very good primarily owing to the US crop. In the US, there will be an exceptionally large soybean crop, well surpassing past production records. This is due to both very good growing conditions, which have occurred throughout the summer, and a big increase in planted area from previous years. In Canada, conditions remain mixed due to excess moisture and a cooler than normal

area has been on the rise. In Brazil, the planting conditions.

Pie chart description: Each slice represents a country (representing 90 percent of production) are AMIS Countries' category. The area within each slice season portion is coloured according to the various 'watch', icons are added to provide information of conditions by area rather than overall national production.

Sources and Disclaimers: The Crop Monitor assessment is conducted by AMIS Rice Countries (BRIS, ASIAN) & Asia RICEI, Australia (ASAR, APAN & MSA), International (ICMMP), IAD, IFPE & IRI, Japan (JISIA & JARI), Ukraine (UAGU) & UAGU, USA (NASS), USA (CONUS) in this joint multi-agency report are consensual statements represented by these experts. Major crop type are Annual Crop Inventory Map, GUANGDONG, GUANGXI, Australian LI, GOSI/AMIS partner crop calendars and USDA crop calendars.

Market Monitor

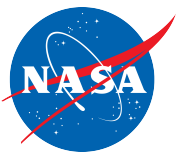
No. 22 – October 2014 www.amis-outlook.org

The Market Monitor is a product of the Agricultural Market Information System (AMIS) which covers the international markets for wheat, maize, rice and soybeans, giving a synthesis of major market developments and the policy and other market drivers behind them. The analysis is a collective assessment of the market situation and outlook by the ten international organizations that form the AMIS Secretariat. Unusually, the report aims at improving market transparency and detecting emerging problems that might warrant the attention of policy makers.

Contents

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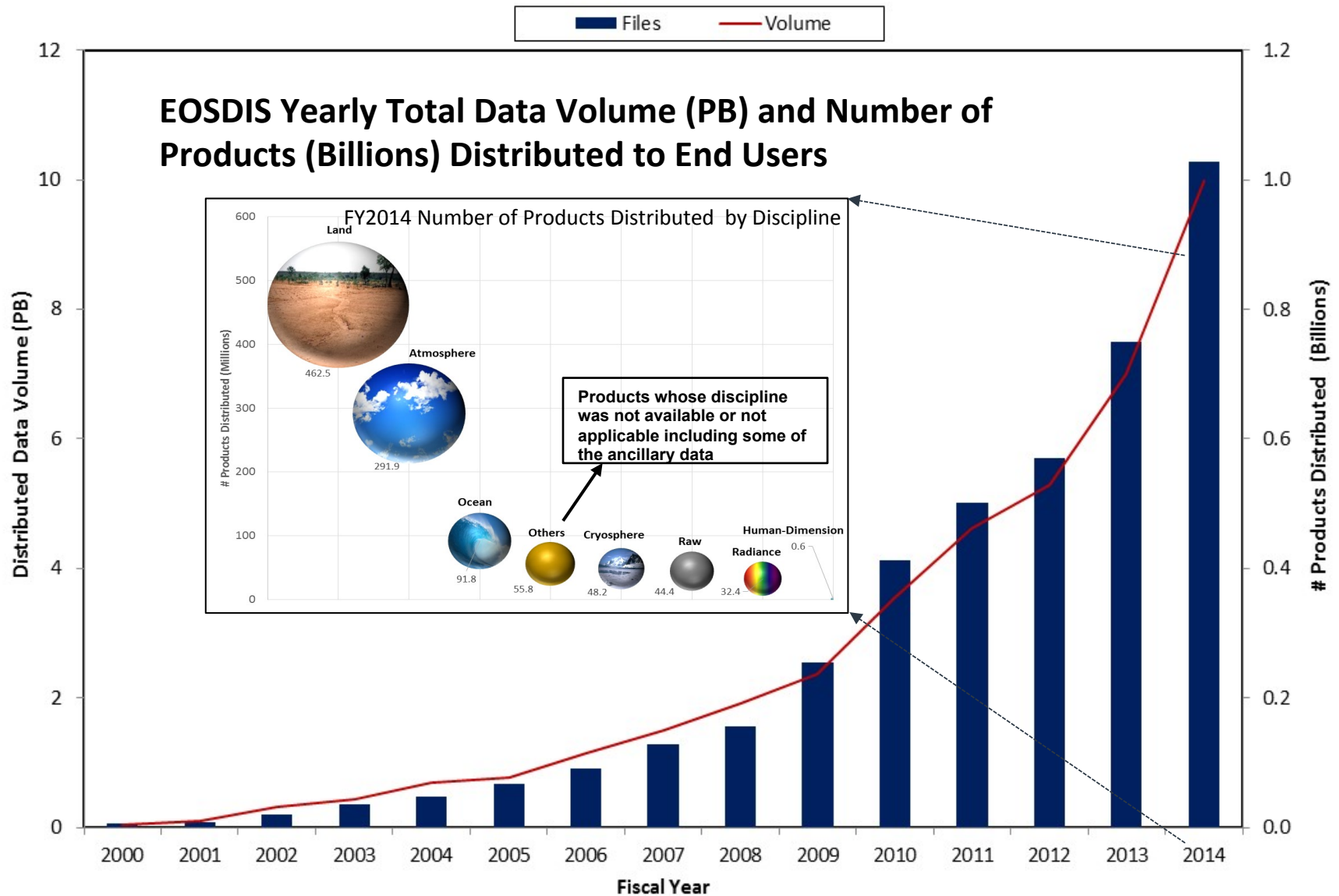
Mapping value chains in NASA EO



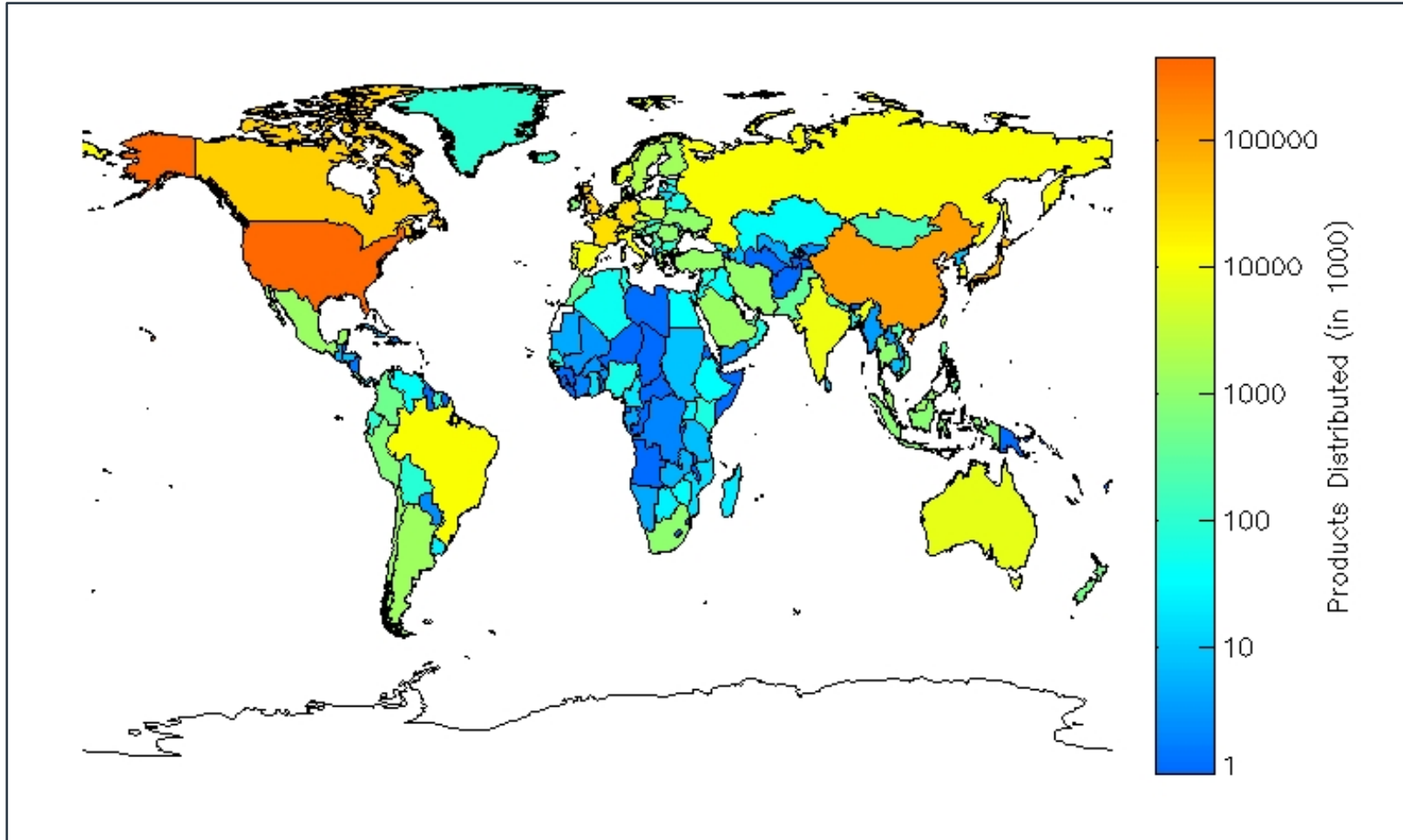
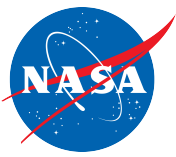
How does NASA map actors engaged in satellite Earth observation and value adding activities, as well as exploring ways to track data streams to final users when possible?

- Track data usage
- Solicit feedback from users
 - surveys
 - feedback tool
 - user interviews
 - social media
- Encourage citation
- Outreach

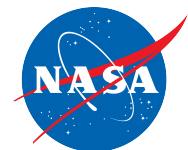
Tracking Distribution: NASA's EOSDIS distributed over a 1 Billion products to Users in 2014



Tracking Distribution: EOSDIS Global Distribution of Number of Data Products for FY2014

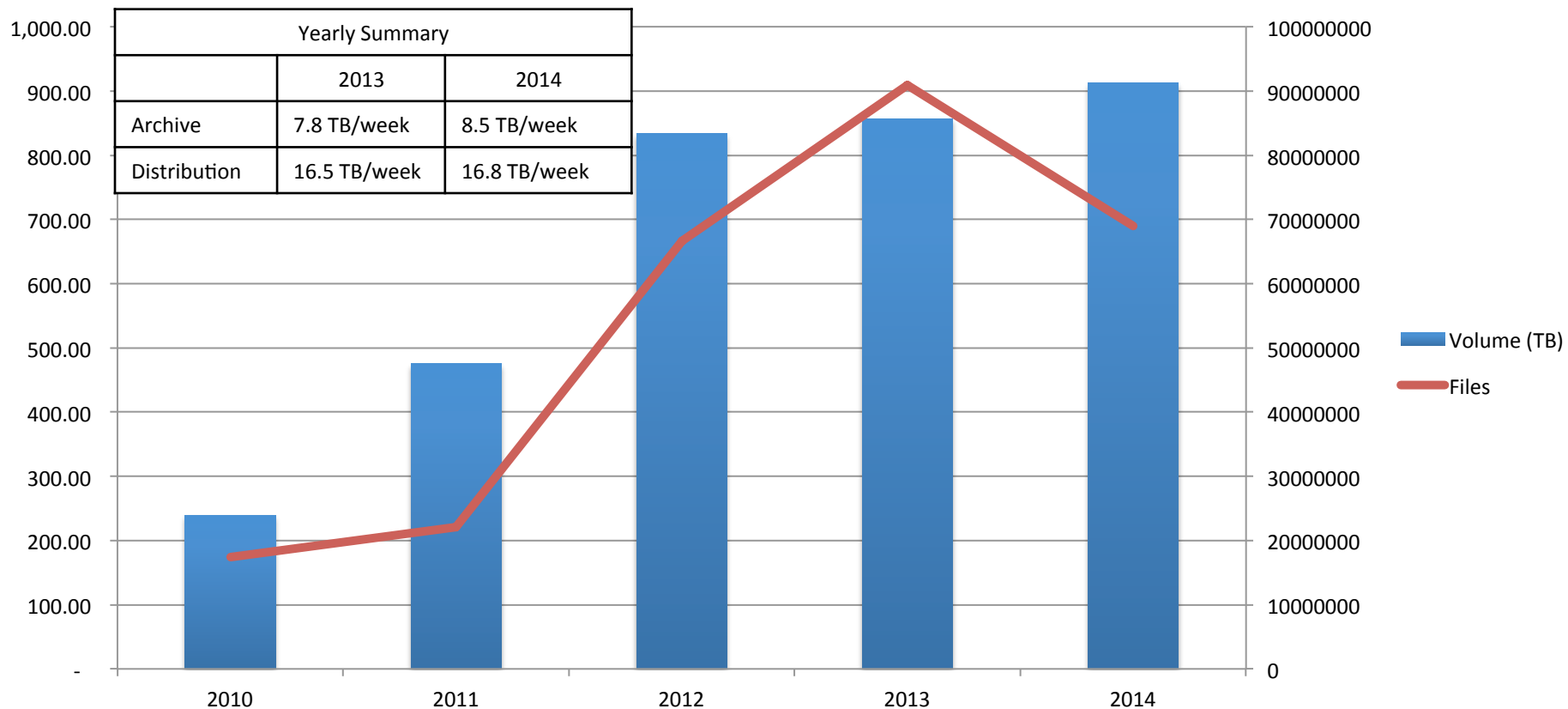


NASA's Earth Science data is distributed globally, the effect of an open data policy now in effect for over 15 years



Yearly Distribution of NRT Products

Yearly NRT Products Data Volume and Files Distributed by LANCE 2010 - 2014



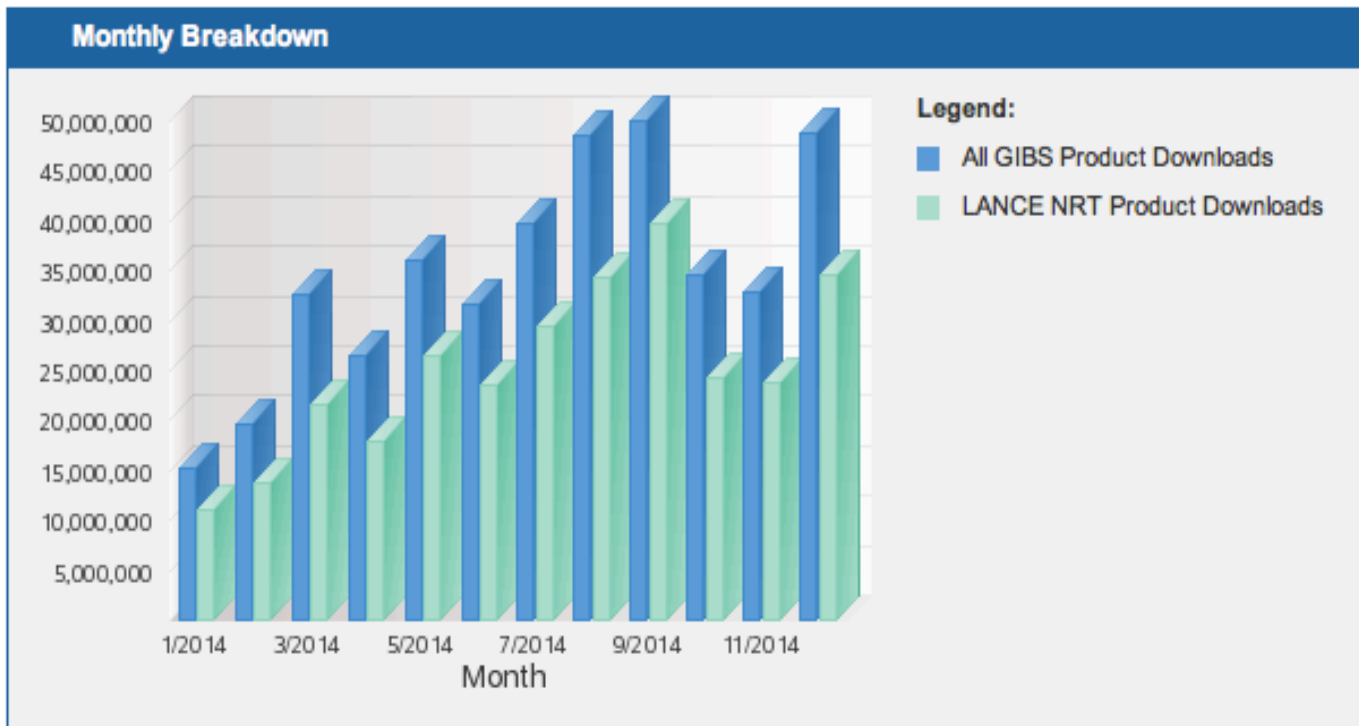
Started to see a shift from Rapid Response downloads to use of GIBS and Worldview

NRT Downloads from Worldview and GIBS

GIBS Map Server Apache Analysis: GIBS NRT Product Downloads Long Term

January 1, 2014 - December 31, 2014

Filters Applied: Date: Jan. 1, 2014 - Dec. 31, 2014



EOSDIS America Customer Satisfaction Index



- Measure customer satisfaction with NASA Earth Observing System Data and Information System at a national level for each Distributed Active Archive Center (DAAC)
- Identify the key areas that NASA can leverage across the Archive Centers to continuously improve its service to its customers
- Assess the trends in satisfaction with NASA EOSDIS specifically in the following areas:
 - Product Search, Selection and Order, Delivery
 - Product Ease of Use, Documentation
 - Customer Support
 - Survey is performed via the web

Type of User~	
General Public	10%
Grade School Teachers	1%
University Professor or Student	53%
Other Education and Outreach	5%
Data Scientist	17%
Earth Science Researcher	39%
Earth Science Modelers	12%
Data Tool Developer	7%
Decision Support Systems Analyst	6%
Other	8%
Number of Respondents	4,147



- In 2014 EOSDIS received an ACSI score of 78 (highest ever)
- Ratings in the mid to upper 70s are considered “very good” by the rating organization, the CFI Group
- 2014 Survey results are based on 4,147 responses
- Responses came from 150 different countries

Comments from the Survey and the Earthdata Feedback tool help define system improvements

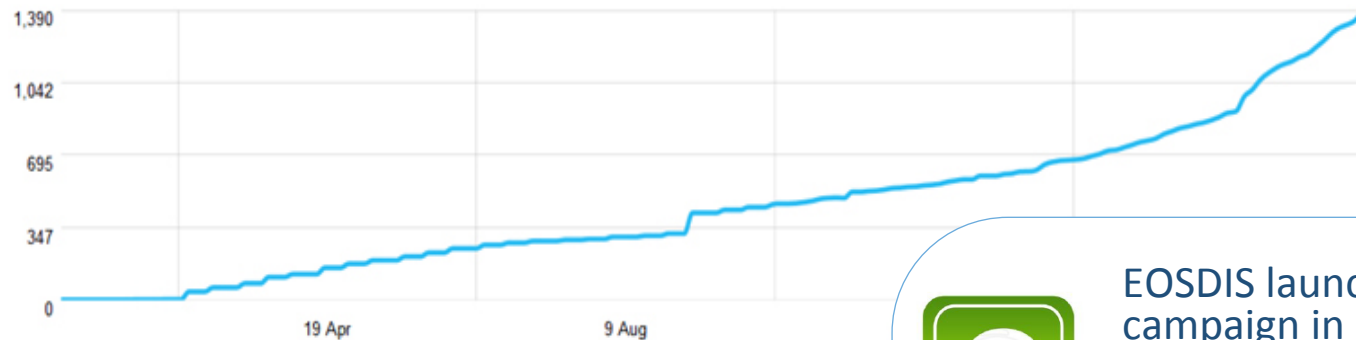
Product Selection and Order	Users want to download data preprocessed and ready to import into tools Bulk delivery of selected data is important as users move to time-series processing
Product Selection and Order	Users want mobile / tablet friendly clients Users want to save searches
Product Documentation	Many requests for tutorials and other educational material on our website
Product Search	Users are requesting the ability to subscribe to data

Increasing Interaction with End Users using Social Media and Webinars



@NASAEarthdata Twitter Account Followers

1,378 followers as of 5/16/2015 (days shown in Pacific time)



Interests

Most unique interests ?

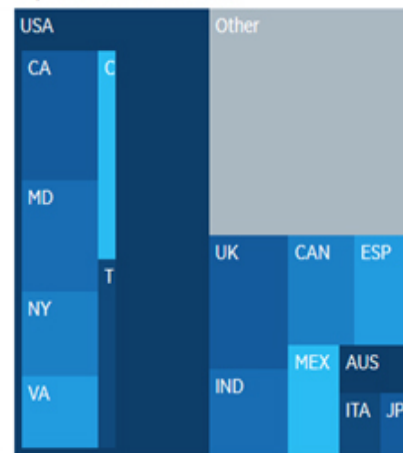
- 67% Space and astronomy
- 36% Biology
- 33% Physics
- 30% Geography
- 25% Geology

Top interests ?

- 72% Science news
- 67% Space and astronomy

Location

Top countries and states



EOSDIS launched its social media campaign in 2014

- Increase awareness and help users discover Earth science data, services, information and tools from EOSDIS
- Provide information and videos to help users discover, access and work with NASA Earth science data
- Webinars are held once a month



NASA Earthdata Webinar Participation and Affiliation

<https://earthdata.nasa.gov/user-resources/webinars-and-tutorials>

EARTHDATA
Powered by EOSDIS

Search datasets, news, articles, and information

User Resources ▾ **Webinars and Tutorials**

More Resources

- Common Metadata Repository (CMR)
- GCMD Keyword Search
- Worldview/GIBS

Webinars and Tutorials

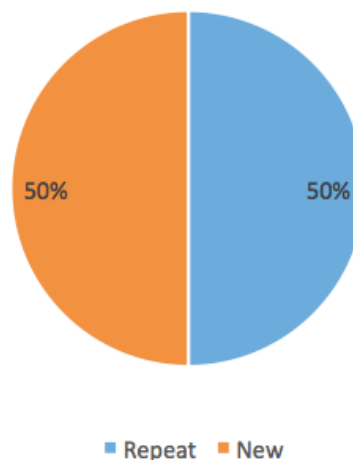
Webinars

NASA Earthdata Webinar Series

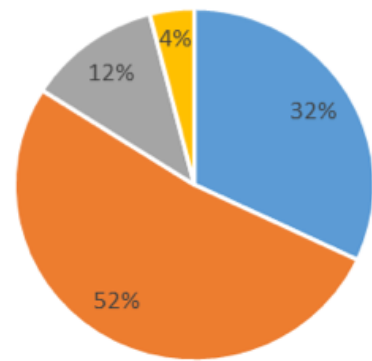
Explore our webinars every fourth Wednesday of each month at 2pm EDT(UTC/GMT-4) to learn more about NASA Earth science data sets, services and tools to discover, access and use these data.

Interested in receiving announcements for upcoming webinars? Sign up to our mailing list.

Attendees



Participant Affiliation



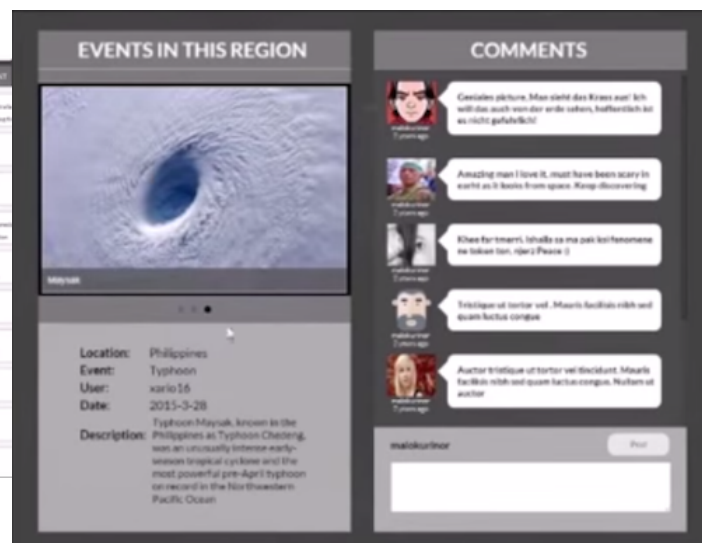
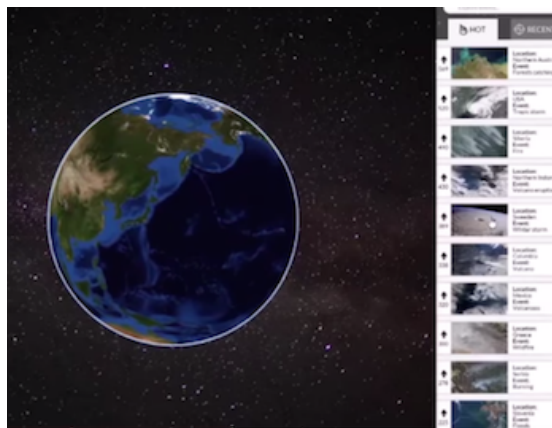
- Repeat is defined as attending 3 or more webinars since May 29, 2013
- New is defined as 2 or less webinars since May 29, 2013

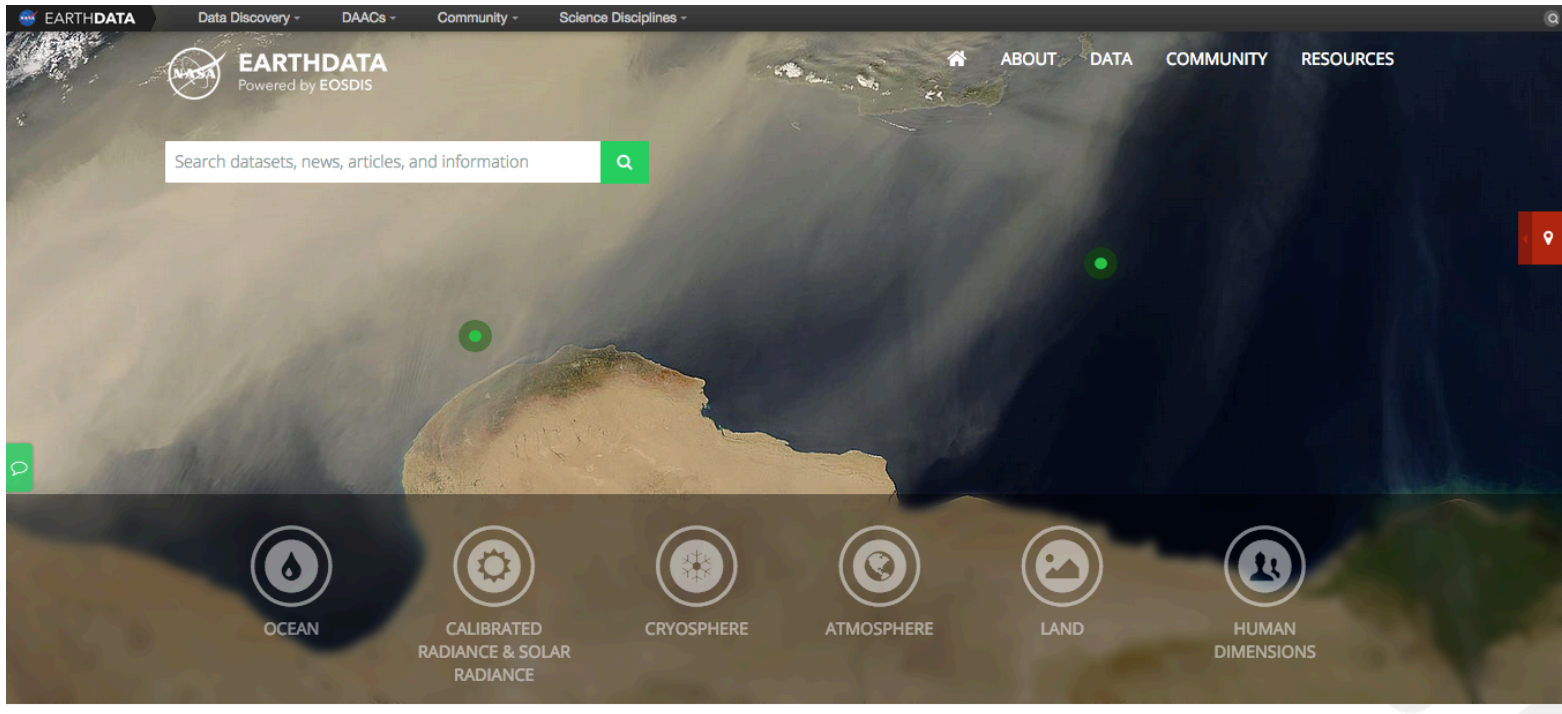
Evolving to Move Data Close to Users



2015 International Space Apps Challenge

- Teams from around the world took up NASA's EOSDIS challenge to find volcanoes, icebergs, and other interesting Earth events in images provided by the Global Imagery Browse Services (GIBS)
 - a two day "hack-a-thon" to develop open-source solutions to address global needs applicable to both life on Earth and life in space.
 - 13k participants in over 133 locations created 949 projects
 - 40 teams put together GIBS-related projects, including one nominated for "Best Use of Data" and "People's Choice".





<https://earthdata.nasa.gov>



NASAEarthData - <https://www.facebook.com/NASAEarthData>



NASAEarthdata-<https://twitter.com/NASAEarthdata>



Search for NASAEarthdata



Search for “NASA Earthdata”



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<http://1.usa.gov/1hmfSVWearthdatawebinars@lists.nasa.gov>