Activity: MYNASADATA ENSO Data Analysis

Objective: Participants will select and plot different climate and meteorological data using a portal created by NASA (http://mynasadata.larc.nasa.gov/).

Materials:

- Internet access
- MYNASADATA PowerPoint
- Creating Plots Using the MYNASADATA Portal handout (one per participant)
- Replication videos demonstrating how to generate the three plots (as below)

Procedure:

- Introduce and briefly explain the MYNASADATA website and the objectives of the data portal using the MYNASADATA PowerPoint.
- Divide the group into pairs.
- Distribute Part I of the Creating Plots Using the MYNASADATA Portal handout.
- Project the MYNASADATA portal and demonstrate how to create a map of precipitation as you follow the steps in Part I of the handout.
- Ask participants to read the instructions during the demonstration but **not** use their computers during the demonstration.
- After the map has been created, lead a discussion with the following prompts:
    - How does the map of precipitation relate to concepts you learned in previous workshops?
    - What information does the map provide?
    - How might this map be used in the classroom?
- Instruct the pairs of participants to create their own map by following the instructions in the text box at the end of the procedures for Part I. Allow five minutes for this.
- Distribute Part II of the Creating Plots Using the MYNASADATA Portal handout.
- Project the MYNASADATA portal and demonstrate how to create a time series of sea level height as you follow the steps in Part II of the handout.
- Again, remind participants to read the written instructions but refrain from using their computers during the demonstration.
- After the time series has been created, lead a discussion with the following prompts:
    - How does the time series of sea level height relate to concepts you learned in previous workshops?
    - What information does the time series provide?
    - How might this time series be used in the classroom?

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- Instruct the pairs of participants to create their own time series by following the instructions in the text box at the end of the procedures for Part II. Allow five minutes for this.
- Distribute Part III of the Creating Plots Using the MYNASADATA Portal handout.
- Project the MYNASADATA portal and demonstrate how to create an animation of sea surface temperature as you follow the steps in Part III of the handout.
- Again, remind the participants to read the written instructions but refrain from using their computers during the demonstration.
- After the animation has been created, lead a discussion with the following prompts:
    - How does the animation of sea surface temperature relate to concepts you learned in previous workshops?
    - What information does the animation provide?
    - How might this animation be used in the classroom?
- Instruct the pairs of participants to create their own animation by following the instructions in the text box at the end of the procedures for Part III. Allow five minutes for this.
- Ask if anyone has questions about using the MYNASADATA portal and answer any questions that arise.

Facilitator Notes:

See the notes section of the MYNASADATA PowerPoint.

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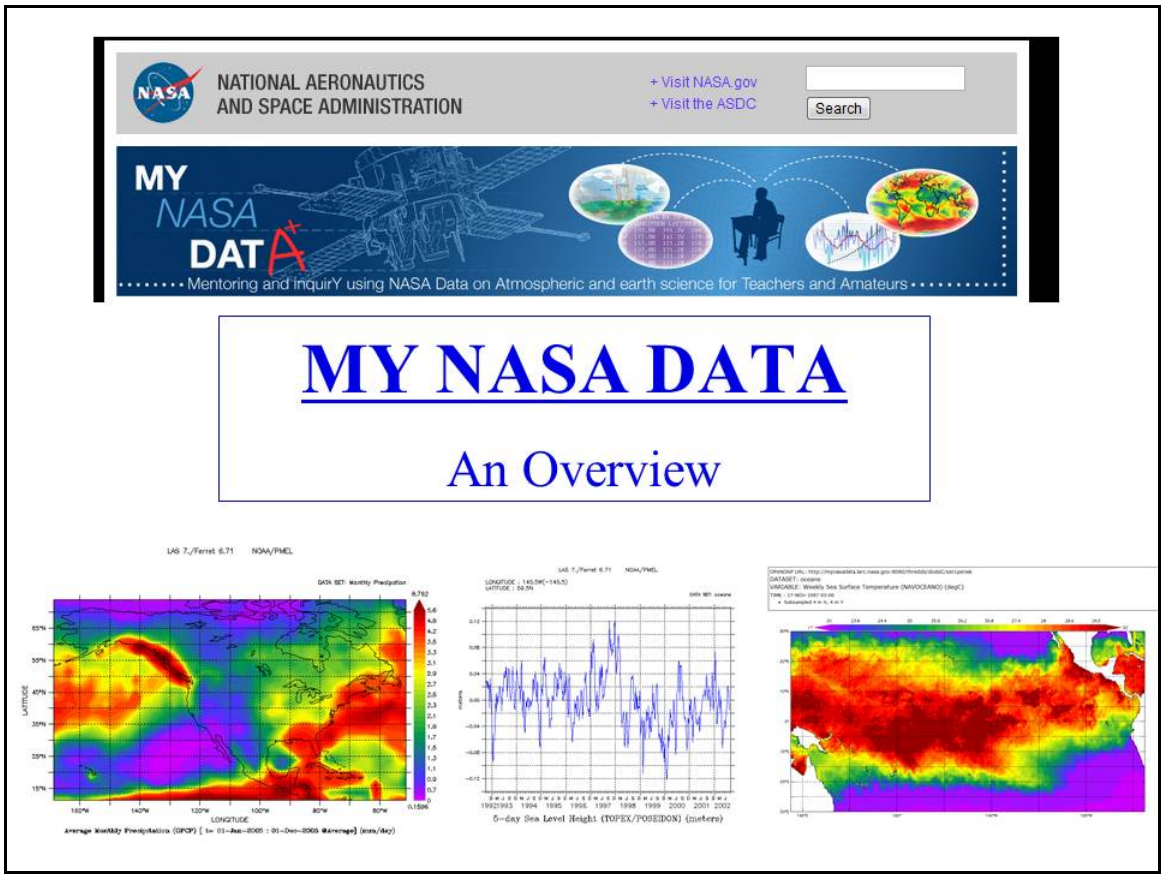

SLIDE 1 NOTES:

"The National Science Teachers Association (NSTA) polled its science educator members about the challenges facing climate change education and highlighted the results in its November 2011 poll report (page 6). One of the responses was, 'The challenge for me is to find for my students actual scientific data that they can evaluate for themselves, so that they can draw better conclusions….' That stimulated the design of this activity to share a resource for finding and actually making maps of scientific data.
"First, I will share the objectives of MYNASADATA and an overview of the content provided on the website. Then I will demonstrate how to generate 3 different types of maps with variables that we've talked about over the past two workshops.

"Please close your laptops and watch as I demonstrate each map. After each example, I will then turn it over to you to generate a similar map using a different variable following the same instructions that I followed. After each map, we will also discuss what kind of information can be extracted from these maps as well as how to use them in your classrooms."

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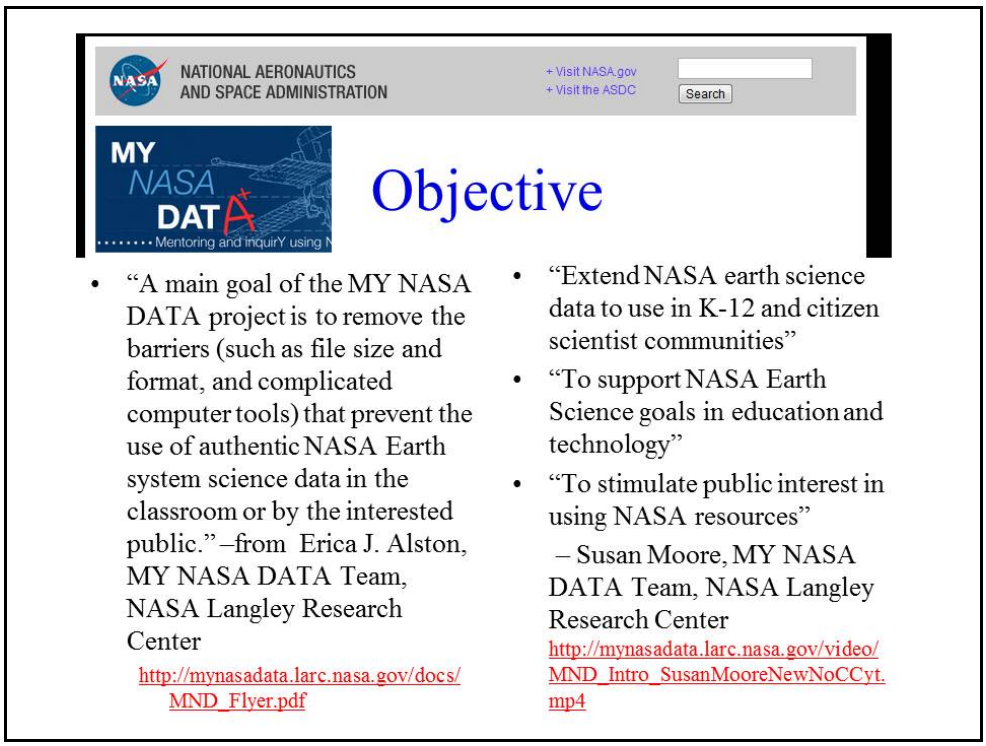
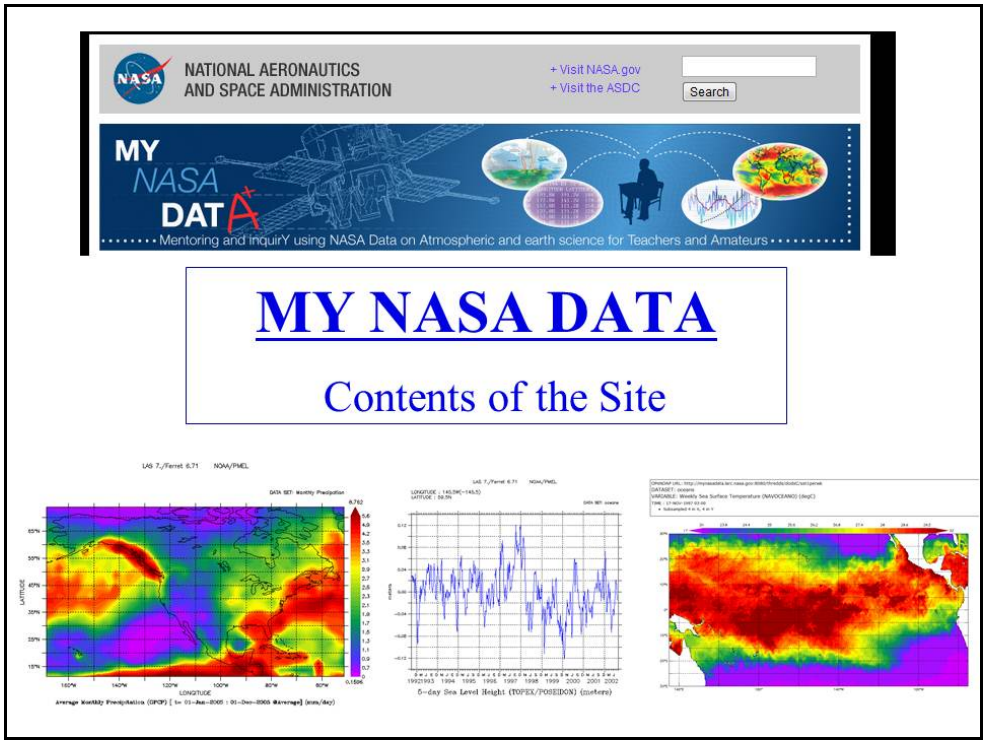


SLIDE 2 NOTES: MYNASADATA is a website with a web-interface data portal so that you can create and analyze plots and maps of actual NASA data.



SLIDE 3, NO NOTES

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Contents of the Site

On the MY NASA DATA homepage you can find:

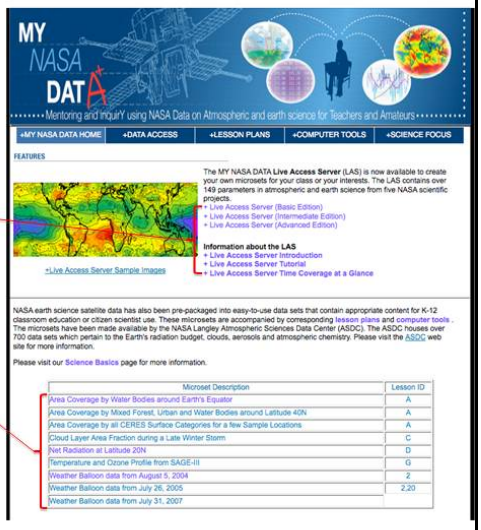
- Data Access
- Lesson Plans
- Computer Tools
- Science Focus
- E-Notes

SLIDE 4 NOTES: Computer Tools include finding a given latitude and longitude, You Tube videos, Microsoft Excel tools, and even calculator tools. E-Notes is a Wikipedia page with updates about the server and website. Lesson plans will be discussed in a minute.

Data Access

The Data Access link allows you to:

- Locate the Live Access Server (LAS)
- Look at the Microset descriptions



SLIDE 5 NOTES: Microsets are portions of data that are already generated and ready for someone to analyze. Usually they are text files with a lot of header information.

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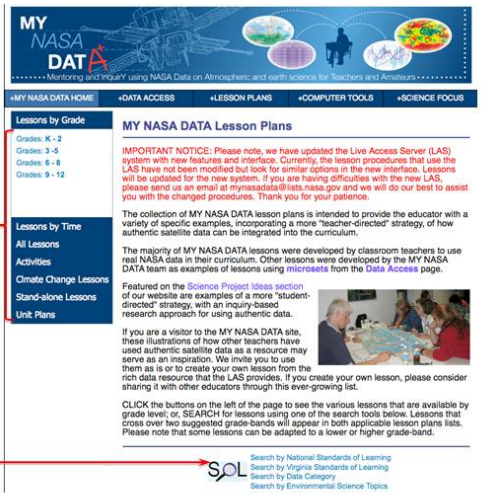
Lesson Plans

This section will allow you to access a variety of lesson plans and search by:

- Grade, Time to Complete, All Lessons, Activities, Climate Change Lessons, Stand-Alone Lessons, and Unit Plans
- Standards of Learning



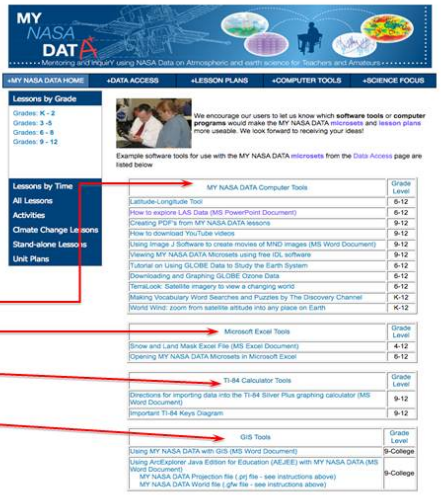
SLIDE 6 NOTES: Because MYNASADATA was created at NASA Langley Center in Virginia, there are lessons under the standards for the State of Virginia as well as national standards.

Computer Tools

This section features many tools that make using the data sets much easier and user friendly.

There are:

- MY NASA DATA Computer Tools
- Microsoft Excel Tools
- TI-84 Calculator Tools
- GIS Tools



SLIDE 7 NOTES: GIS – Graphical Information Systems – basically modern day cartography (making maps). Most regional planners use GIS, but educators don't use it as much.

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Science Focus

"The Science Focus section features links to pages that provide additional explanation and information about certain features of our website, related science concepts, and other sources of scientific data."

SLIDE 8, NO NOTES

How to Access Data

- From the home page, click on the *Data Access* icon.

SLIDE 9, NO NOTES

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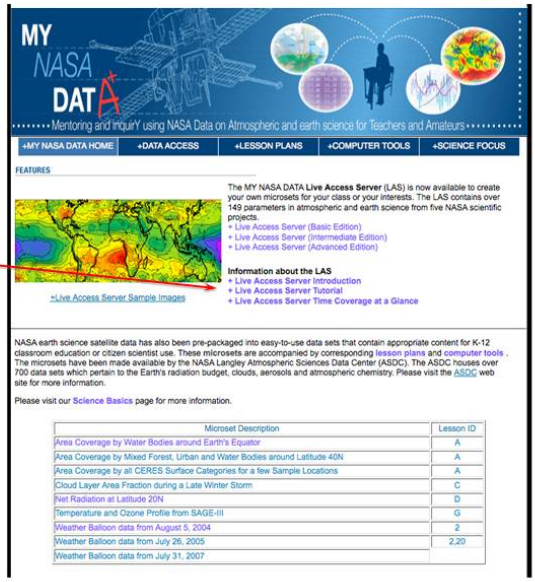
How to Access Data

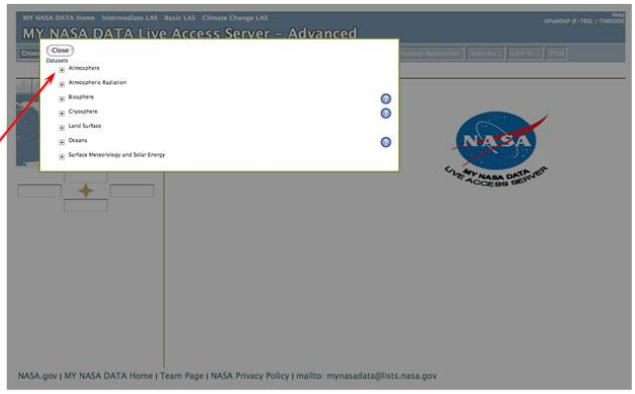
- From the Data Access page, choose one of the *Live Access Server* options
- Basic - simplest and fewer parameters
- Intermediate - data organized by "spheres"
- Advanced - more options and all available parameters



SLIDE 10, NO NOTES

How to Access Data

- Choose the type of data you would like to explore by topic area
- For example, Atmosphere



NOTE: This is the Advanced Edition interface. The others are similar (but simpler).

SLIDE 11 NOTES: General procedure: If you have a category of data in mind that you would like to plot, you first need to see what's available.

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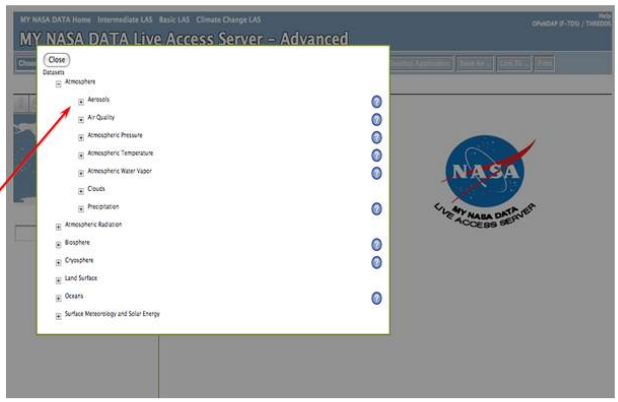
How to Access Data

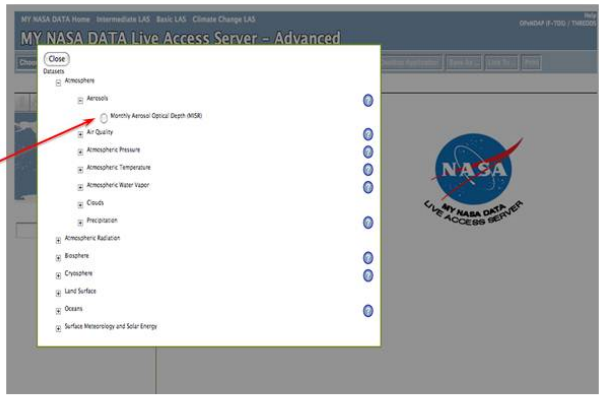
- Now we choose the specific kind of atmospheric data we want to explore
- For example, we choose *Aerosols*



SLIDE 12, NO NOTES

How to Access Data

- We now select the variable(s) we want to explore:
- To select the variable, check the box(es) of the variable(s) you want
- Note: For this data type, there is only one option available



SLIDE 13, NO NOTES

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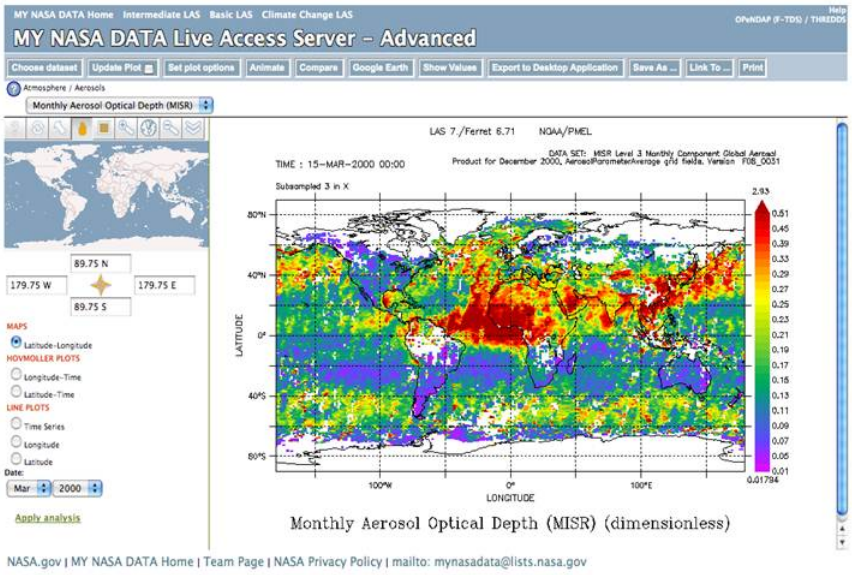
Resulting Plot

Aerosols

The **Multi-angle Imaging Spectro-Radiometer (MISR)** provides high quality aerosol optical depth (AOD) at various spatial and temporal resolutions. Shown is global monthly average of optical depth as shown in the MY NASA DATA LAS for June 2004.



Note: White areas in this plot are missing data due to persistent clouds, or lack of sunlight (South Pole) to detect the aerosols.

SLIDE 14 NOTES: The MISR Level 3 global data products are reported on a rectangular grid that is 0.5 degree latitude by 0.5 degree longitude. The Level 2 aerosol product is by orbit and it has 17.6 km resolution.

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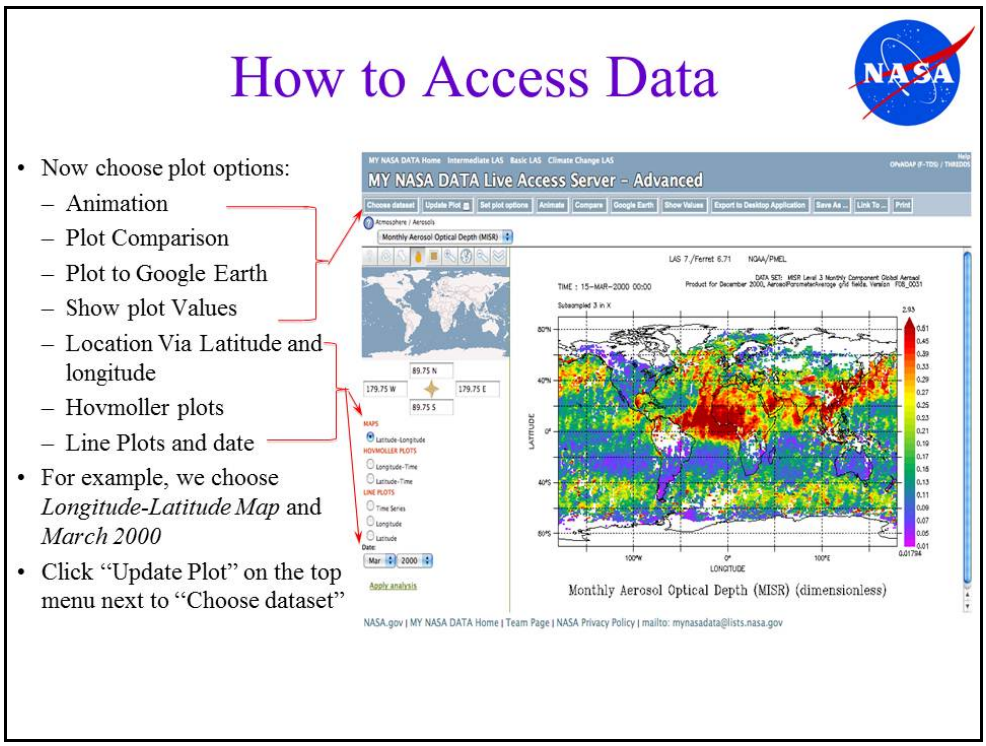
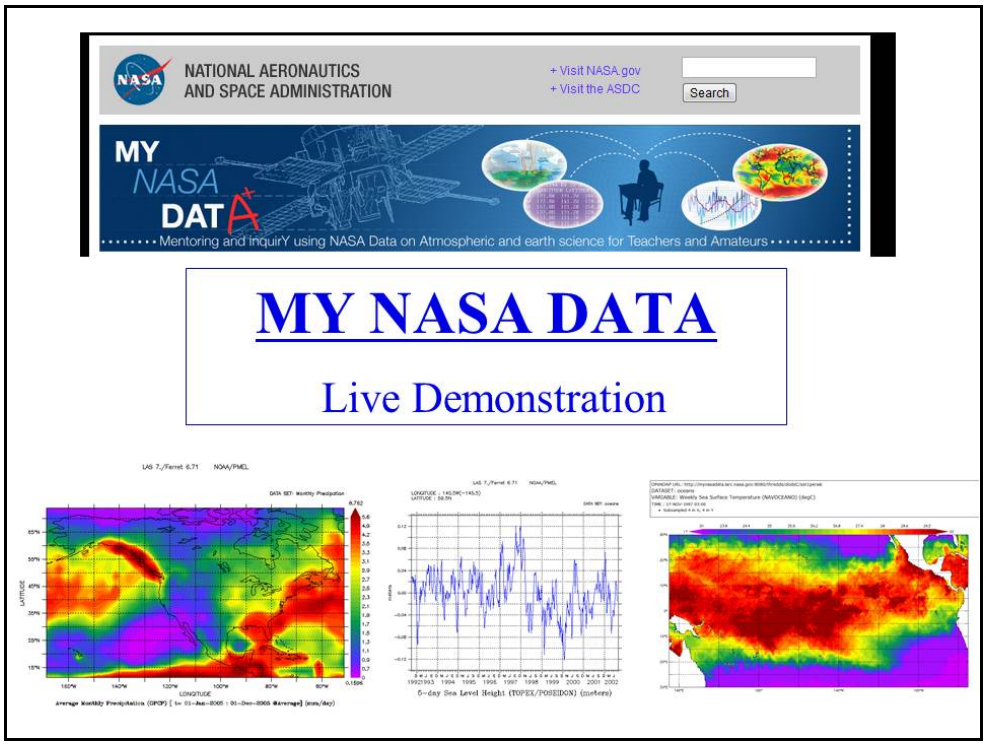


SLIDE 15 NOTES: **Output of the previous steps is shown on the next slide.



SLIDE 16, NO NOTES

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Handout: Creating Plots Using the MYNASADATA Portal

Part I: Creating a map of yearly average precipitation

In this exercise, you will create a map of yearly average precipitation over North America.

- **Go to the MYNASADATA homepage.**
  - Access the homepage (http://mynasadata.larc.nasa.gov/) and click on the **green book icon** to access the data.
- **Access the Data Server.**
  - Click on + **Live Access Server (Advanced Edition).** This will open the MYNASADATA portal.
- **Select data.**
  - Drag your mouse to the **Choose dataset** button in the top left corner. If the menu does not appear, click the **Choose dataset** button.
  - Click on the **+** sign next to **Atmosphere** and then on the + sign next to **Precipitation.**
  - For this example, click the circle next to **Monthly Precipitation (GPCP).**
- **Modify your graph.**
  - Specify the kind of map.
    - Make sure **Latitude-Longitude** is selected under **Maps.**
    - Create an "average" map.
      - Click on **Apply Analysis** at the bottom of the list on the left.
      - Under **Analysis type,** click the down arrow and select **Average**.
      - Under **Analysis region type**, click the down arrow and select **Time**.
  - Specify the date range.
    - Modify the date range to **January 2005** in the first row of drop-down boxes and **December 2005** in the second row.
    - Note: You must modify the year before you can modify the month.
  - Select the location point or region.
    - To narrow the spatial region of the map, locate the small blue and white world map (upper left).
    - Above this map, click on the last symbol on the right (two arrows pointing downward). This will open another drop-down menu from which to select a region.
    - Click on **North America**.
  - Click **Update Plots.**

Now, following the steps outlined above, create a different map by substituting **Monthly Snow/Ice Amount (ISCCP**) under the **Cyrosphere** category in the "Select data" section.

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Part II: Creating a time series of sea level height near the southern coast of Alaska

In this example, you will create a graph of sea level height over a 10-year period, similar to the graph used in Workshop 2.

- **Go to the MYNASADATA homepage.**
  - Access the MYNASADATA homepage (http://mynasadata.larc.nasa.gov/) and click on the **green book icon** to access the data.
- **Access the Data Server.**
  - Click on + **Live Access Server (Advanced Edition).** This will open the MYNASADATA portal.
- **Select data.**
  - Drag your mouse to the **Choose dataset** button in the top left corner. If the menu does not appear, click the **Choose dataset** button.
  - Click on the **+** sign next to **Oceans** and another drop-down menu will appear that lists different datasets (and providers) of ocean-related variables.
  - For this example, click the circle next to **5-day Sea Level Height (TOPEX/POSEIDON)**
- **Modify your graph.**
  - Specify the kind of map.
    - Under **Line Plots,** select **Time Series.**
  - Specify the date range.
    - Modify the date range to **October 04, 1992** in the first row of drop-down boxes, and **August 13, 2002** in the second row.
  - Select the location point.
    - Locate the small blue and white world map (upper left). Below the map are four boxes representing the edge locations of latitude and longitude of the map shown below (Figure 1)

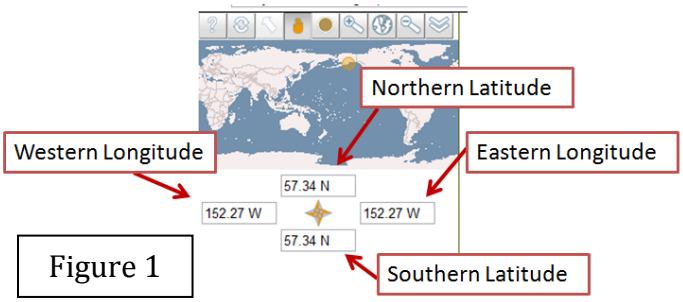

Figure 1

    - Set the location to **60N, 145W**. Enter the latitude in both latitude boxes and the longitude in both longitude boxes.
    - Note: You must enter the letter corresponding to **E**ast, **W**est, **N**orth, or **S**outh.
  - Click **Update Plots.**

Now, following the steps outlined above, create a different graph by substituting **Monthly Precipitation (GPCP**) under the **Atmosphere/Precipitation** category in the "Select data" section. In the "Modify your graph" section, select the location 28°N, 82.5°W.

Note: Abbreviate dates to month and year.

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Part III: Creating an animation of sea surface temperature over a two-year period

In this exercise, you will create an animation of sea surface temperatures in the equatorial Pacific over a two-year period.

- **Go to the MYNASADATA homepage.**
  - Access the homepage (http://mynasadata.larc.nasa.gov/) and click on the **green book icon** to access the data.
- **Access the Data Server.**
  - Click on + **Live Access Server (Advanced Edition).** This will open the MYNASADATA portal.
- **Select data.**
  - Drag your mouse to the **Choose dataset** button in the top left corner. If the menu does not appear, click the **Choose dataset** button.
  - Click on the **+** sign next to **Oceans.**
  - For this example, click the circle next to **Weekly Sea Surface Temperature (NAVOCEANO).**
- **Modify your graph.**
  - Specify the kind of map.
    - Make sure **Latitude-Longitude** is selected under **Maps.**
  - Select the location point or region.
    - To narrow the spatial region of the map, locate the small blue and white world map (upper left).
    - Above this map, click on the last symbol on the right (two arrows pointing downward). This will open another drop-down menu from which to select a region.
    - Click on **Equatorial Pacific**.
- **Create an animation**.
  - Click on the **Animate** button at the top of the page. A box listing animation options and inputs will appear.
    - In the box next to **Evaluate Expression**, enter **$**.
    - Note: The dollar sign represents the variable you are plotting. To change SST from Celsius to Kelvin, enter a formula in which $ represents SST in Celsius. Example: $+273.15
    - In the box next to **Time Step**, enter **1**.
    - Click on the **OK** button.
    - A new tab (or window) will appear in which your animation will be displayed.
  - Specify a date range.
    - Modify the date range to **January 06, 1997** in the first row of drop-down boxes and **December 31, 1998** in the second row.
    - In **Plot every_th frame**, enter **2**.
    - Click **Submit**. Wait for the server to download all images before toggling the options at the bottom of the page.

Now, following the steps outlined above, create a different animation by substituting **Monthly Near-Surface Air Temperature (ISCCP**) under the **Atmosphere/Atmospheric Temperature** category in the "Select data" section. In the "Modify your graph" section, select Asia. Note: Abbreviate dates to month and year.

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