Visualizing the Environment

The NOAA Environmental Visualization Laboratory

Processing NOAA data and imagery into effective media, communications, and education products
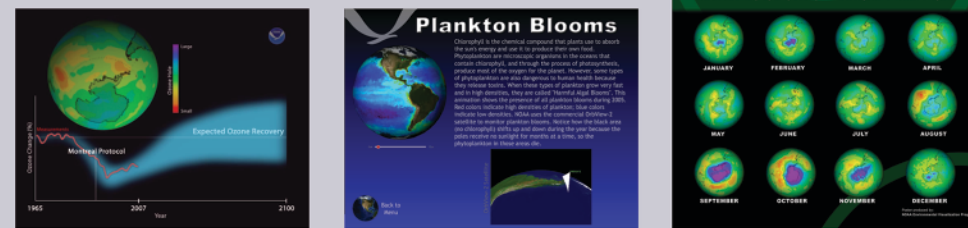
www.nnvl.noaa.gov

① Our process starts with addressing the need for a visualization, commonly:

- Direct requests from the media or museum
- Requests from NOAA and its line offices
- Educational priorities, such as International Year of the Reef or International Polar Year.
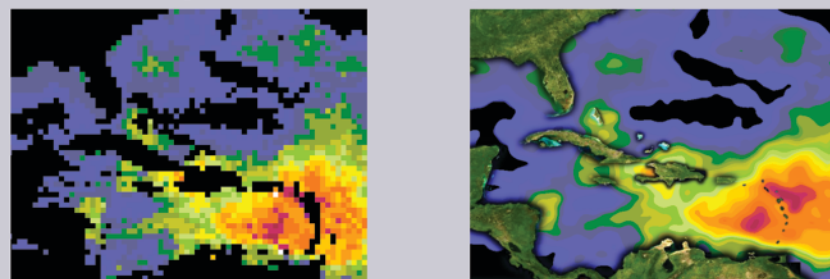- Independent development based on identified needs

With the request comes an identification of the display format, such as:

- Television
- Spherical Displays (e.g., Science on a Sphere)
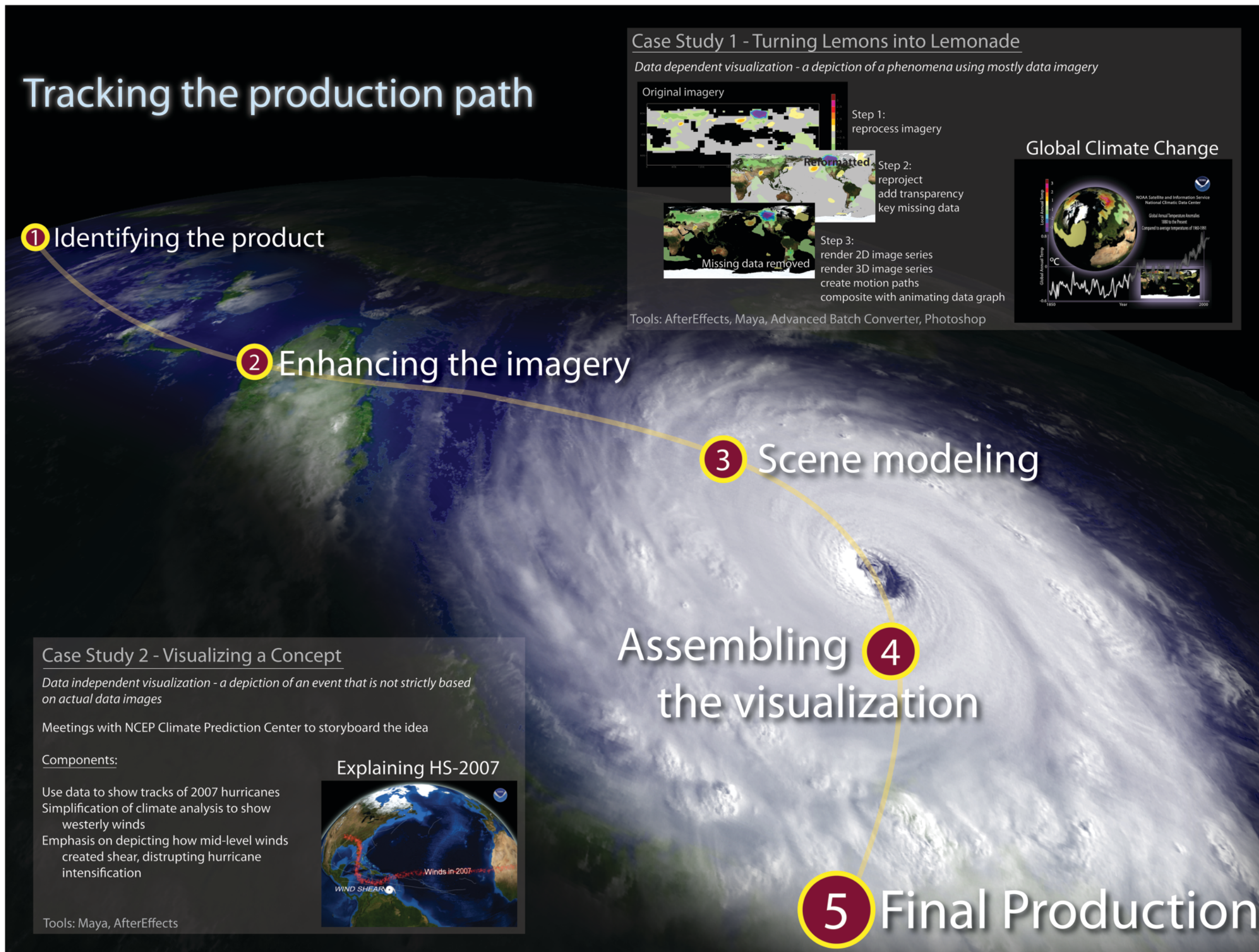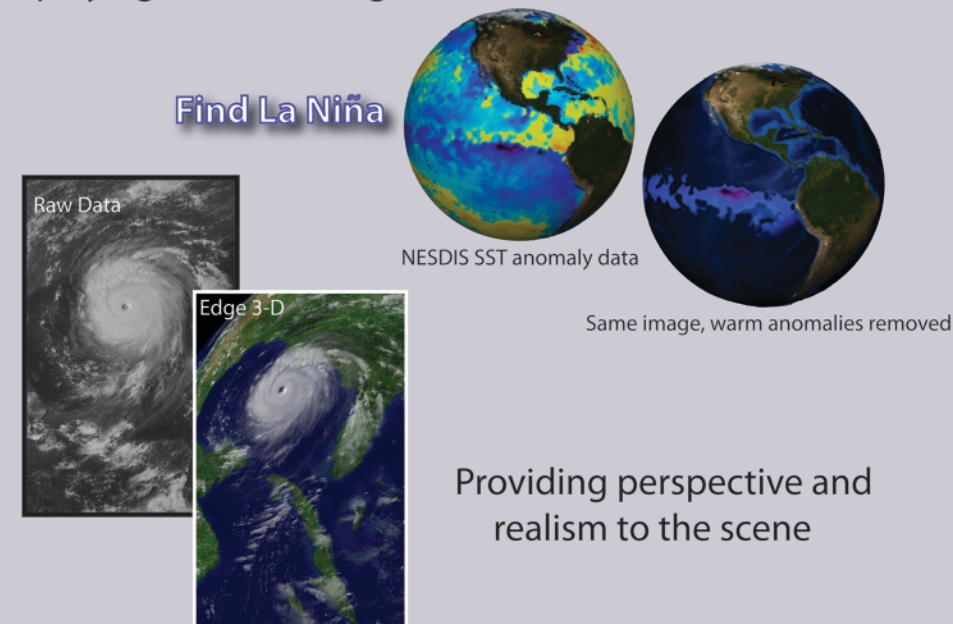- Interactive kiosks
- Images and posters

② In most cases, visualizations are used to explain a concept to the general public. As a result, the best looking data, that which captures attention, is desired. We enhance and simplify data to meet this goal. Enhancement is achieved by:
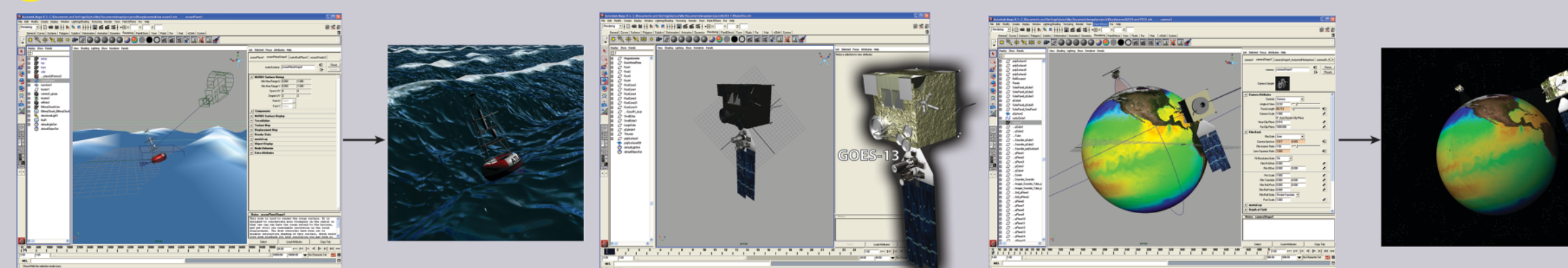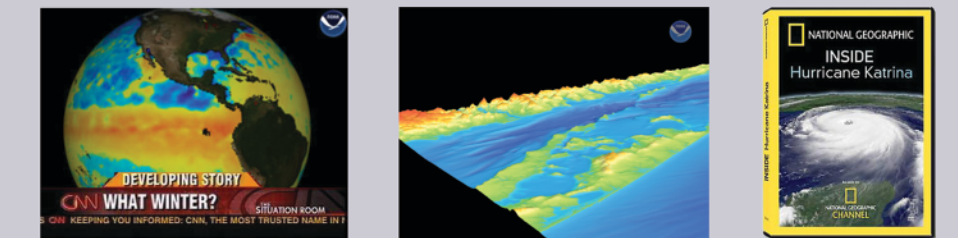
Pixel smoothing and interpolating:
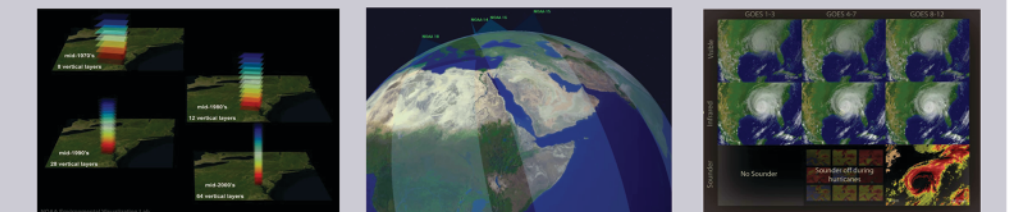
Simplifying and removing extraeneous data:

Find La Niña

NESDIS SST anomaly data

Raw Data

Edge 3-D

Same image, warm anomalies removed

Providing perspective and realism to the scene

Tracking the production path

① Identifying the product

② Enhancing the imagery

③ Scene modeling

④ Assembling the visualization

⑤ Final Production

Case Study 1 - Turning Lemons into Lemonade

Data dependent visualization - a depiction of a phenomena using mostly data imagery

Original imagery

Step 1: reprocess imagery

Reformatted

Step 2: reproject add transparency key missing data

Missing data removed

Step 3: render 2D image series render 3D image series create motion paths composite with animating data graph

Global Climate Change

Tools: AfterEffects, Maya, Advanced Batch Converter, Photoshop

Case Study 2 - Visualizing a Concept

Data independent visualization - a depiction of an event that is not strictly based on actual data images

Meetings with NCEP Climate Prediction Center to storyboard the idea

Components:

Use data to show tracks of 2007 hurricanes
Simplification of climate analysis to show westerly winds
Emphasis on depicting how mid-level winds created shear, disrupting hurricane intensification

Explaining HS-2007

Winds in 2007

WIND SHEAR

Tools: Maya, AfterEffects

③ Using Autodesk Maya, we are able to model complex objects and scenes, then combine data and models into a single visualization.
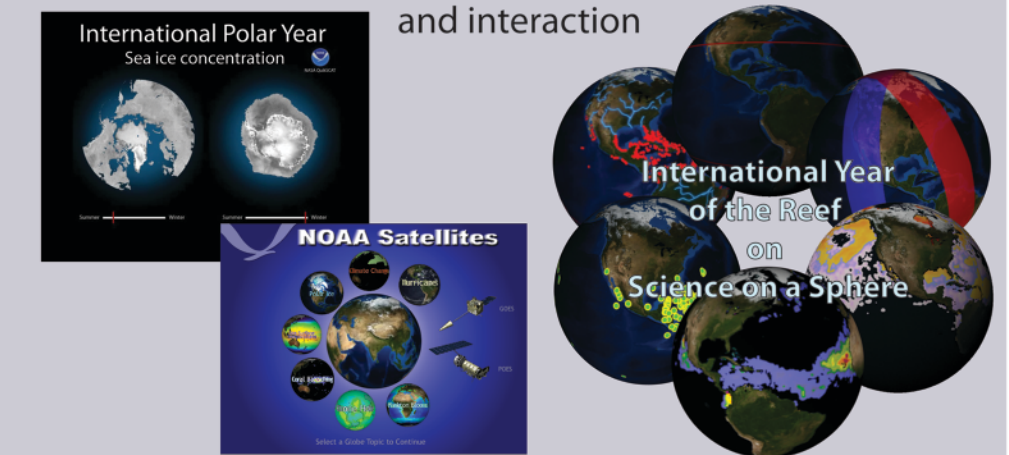
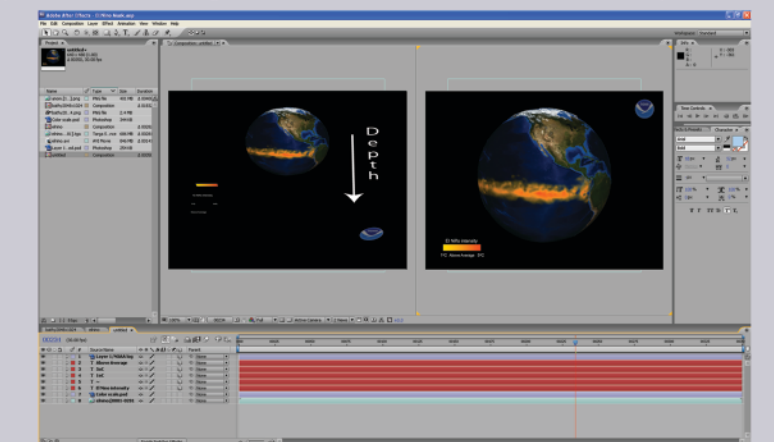**⑤** **Media Release:** short, simple clips; significant events

Technical audiences: observing systems and advancements

Educational outreach: use standards, multiple data sources, and interaction

International Polar Year
Sea ice concentration

NOAA Satellites

International Year of the Reef on Science on a Sphere

④ Using Adobe AfterEffects, we're able to assemble multiple 3-D layers into a single piece, incorporate annotation and explanations, figures, and animate the final product.

Moving, zooming, rotating, and labeling keep the viewer engaged, while also directing attention to the important aspects of the visualization.

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