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# New Web Interface for Real-Time Visualization of NOAA Atmosphere Model Data

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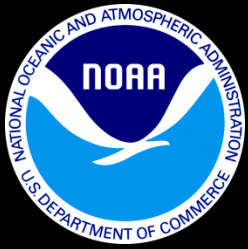
Computer Science

Engagement Enterprise

NESDIS / Environmental Visualization Lab

Dan Pisut

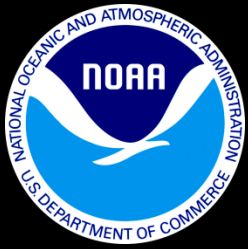
July 20, 2015



# Outline

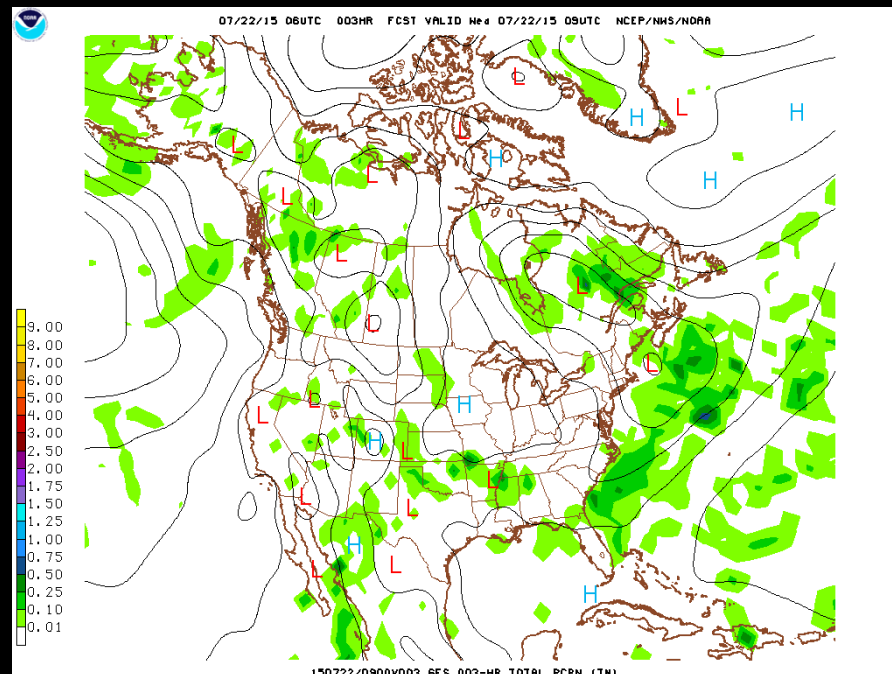
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- Goals
- Video Demo
- About Global Forecast System
- Visualization Architecture
- Getting Started
- Challenges
- Final Product
- Next Steps
- Acknowledgements



# Goal #1

## Modernize display of weather data

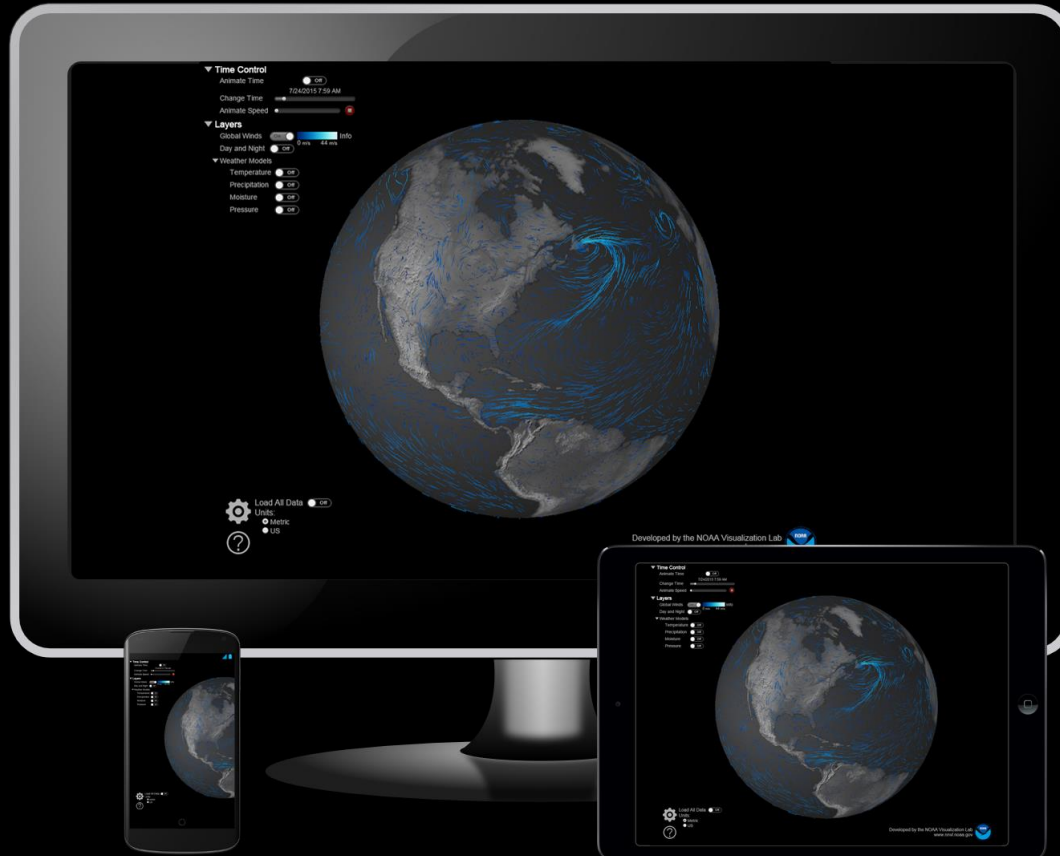


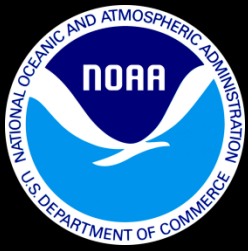
Model Analyses and Guidance  
([mag.ncep.noaa.gov](http://mag.ncep.noaa.gov))



# Goal #2

Online access of real-time weather data





# Goal #3

## Easy to use interface

**INSTRUCTIONS**  
To display real-time information for a particular area:

1. Disable popup blockers for this site. (be sure to check blockers in Google's toolbar or other browser toolbars)
2. Select 'Location' and 'Information' using pulldown menus above map, and click on 'GO' to refresh map display
3. Click on any station symbol or polygon to display data or forecast. (the 'Link to Data' Map Tool is activated by default for hotspot/link display)

nowCOAST is not monitored 24 hours a day and thus timely delivery of data, warnings & forecasts is not guaranteed. Users can use NOAA dissemination systems (e.g. NOAA's Weather Radio, WeatherWire, EMWIN, etc.) for timely delivery of NOAA products.

**Map Tools** tool help  
Active Tool: Zoom In

Map Tools: Use the selection of Map Tools found below to navigate the nowCOAST map manually (instead of using pulldown menus above). The Link to Data, Identify, and Select by Rectangle tools can be used to retrieve information about stations or forecast zones in the 'active' Map Layer.

**Map Layers** Controls  Display  Active

Active Layer: Short Duration Warnings  
(Click on individual layer names below for more info on each)

**On-Map Data, Imagery, Forecasts:**

- Automatic Refresh Every 4 Minutes
- Observations - In-Situ Stations:**
  - Surface Meteorological/Ocean
    - Station ID
    - Air Temp (deg F)
    - Dew Point Temp (deg F)
    - Wind (knots)
    - Mean Sea Level Pressure (mb)
    - Visibility (miles)
    - Sea Surface Temp (deg F)
    - Significant Wave Height (feet)
- Observations - Remote Sensors:**
  - Weather Radar Mosaic
  - Cloud Imagery (GOES Visible)
  - Cloud Imagery (GOES Infrared)

**Analyses:**

- Meteorological
  - Surface Air Temperature
  - Surface Wind Speed
  - Surface Wind Velocity (Barb)
  - Surface Wind Velocity (Vector)
  - Precipitation Amount
- Oceanographic
  - Sea Surface Temperature

**Model Nowcast/Forecast Guidance:**

- Oceanographic
  - Surface Water Currents
    - w/Speed
    - w/Sea Surface Temp
    - w/Total Water Levels

**Hazard Advisories, Watches, Warnings:**

- Short Duration Warnings  
Last Updated at: Thu Jul 23 2:19 PM EDT

**redraw map**

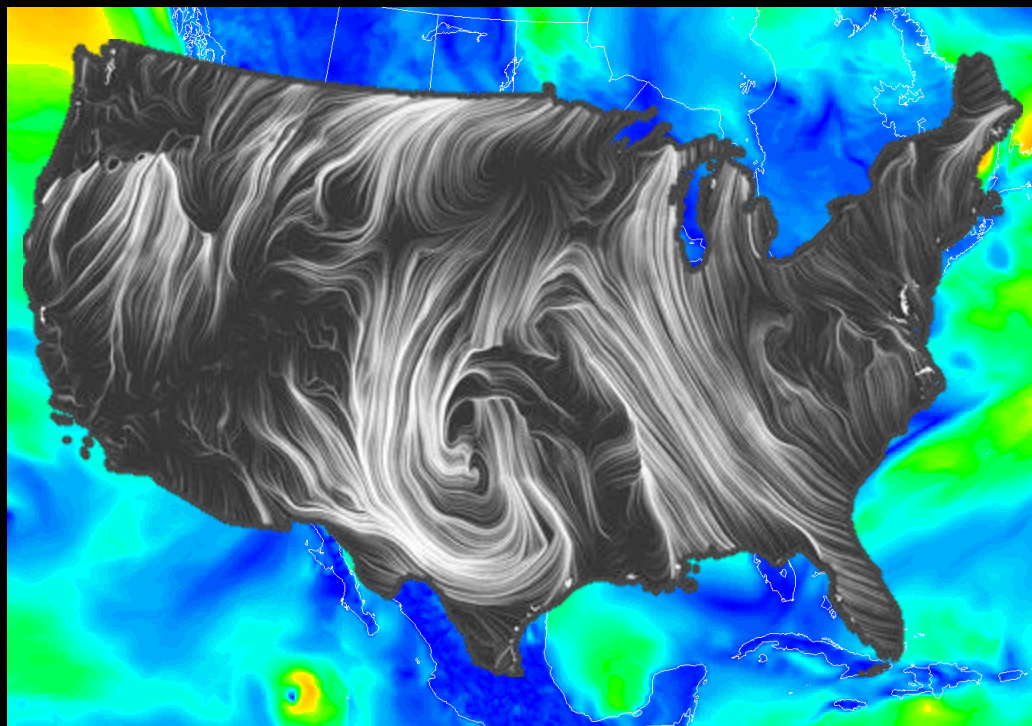
- Redraw Map Automatically

DOC > NOAA > NOS > OCS | User Survey  
Web site owner: Office of Coast Survey | Privacy Policy



# Goal #4

**Easy to understand the direction, magnitude, and time**







# About Global Forecast System

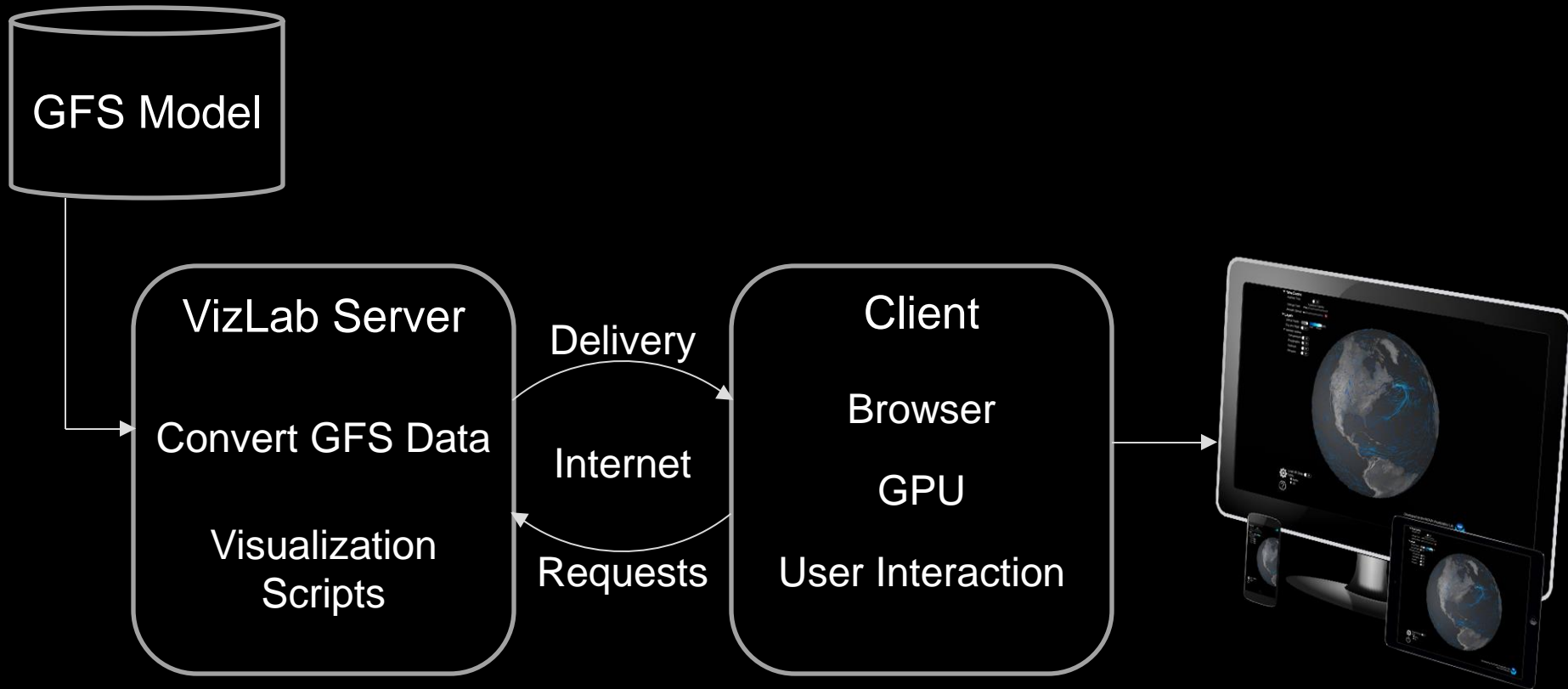
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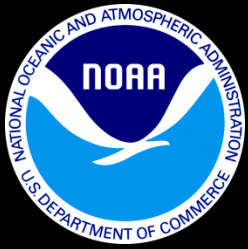
- Main weather model used by NOAA and the weather industry
- Updates and resolution
- Data accessed via a THREDDS server, simplifying access to the 400 GB of data
- Gridded data output





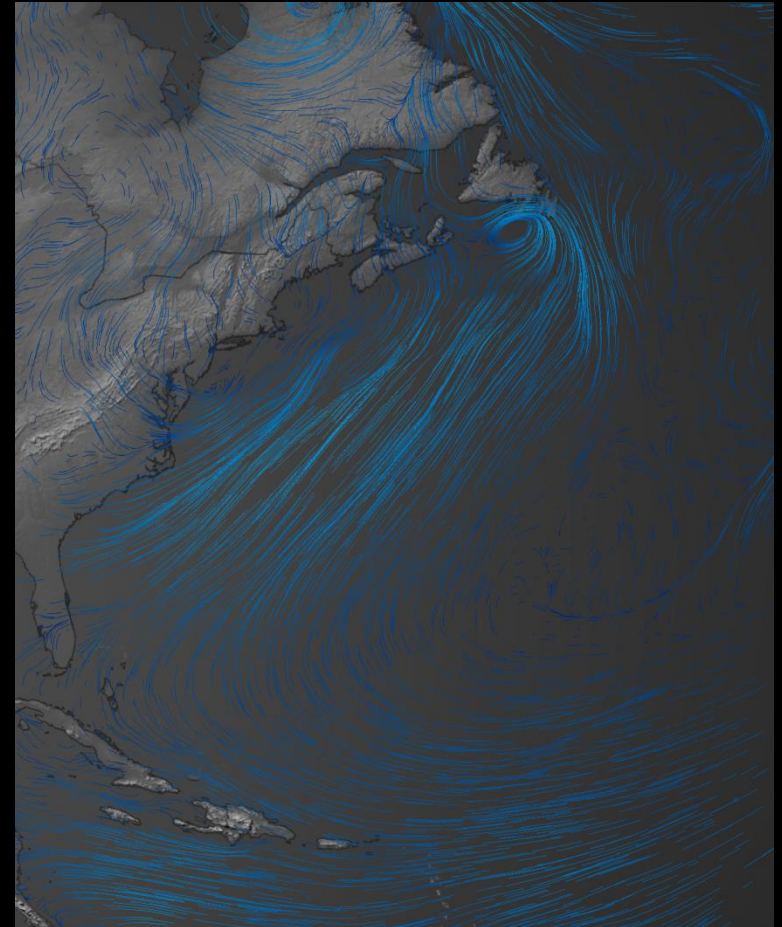
# Visualization Architecture

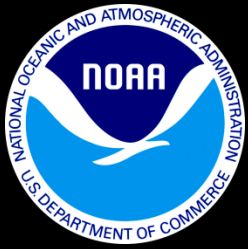




# Getting Started

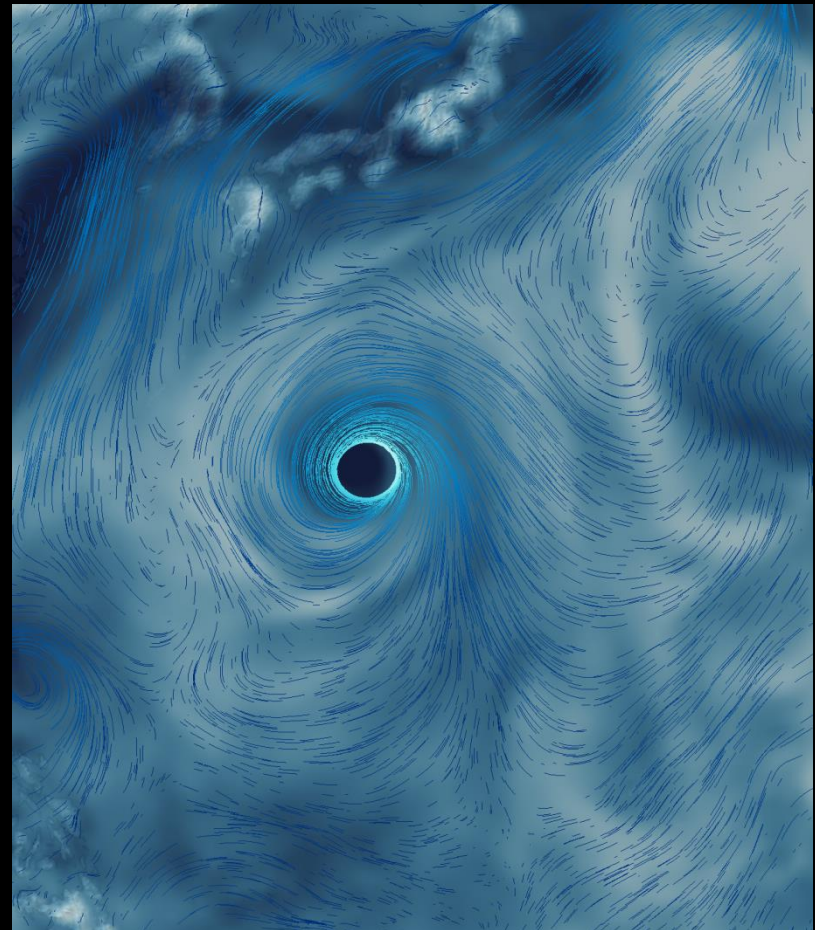
- Configure VizLab servers with JavaScript libraries
- Convert GFS output to JSON
- Learn necessary JavaScript libraries.
- Develop prototype





# Challenges

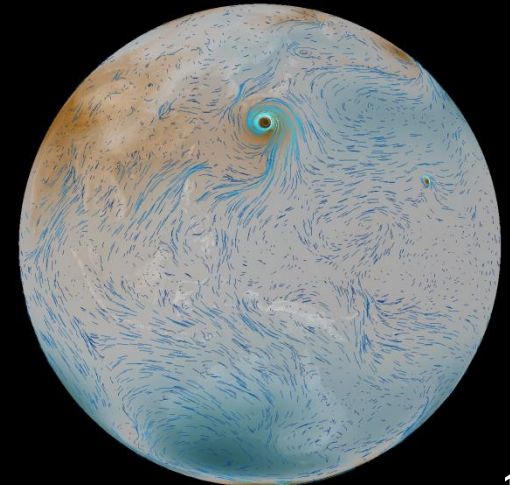
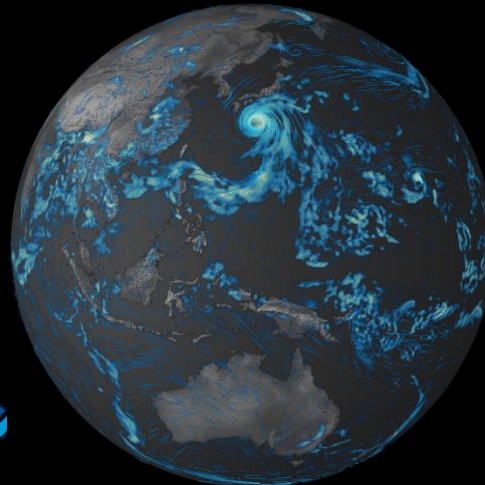
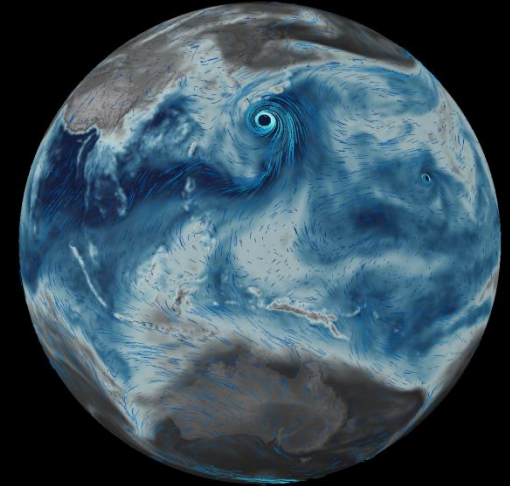
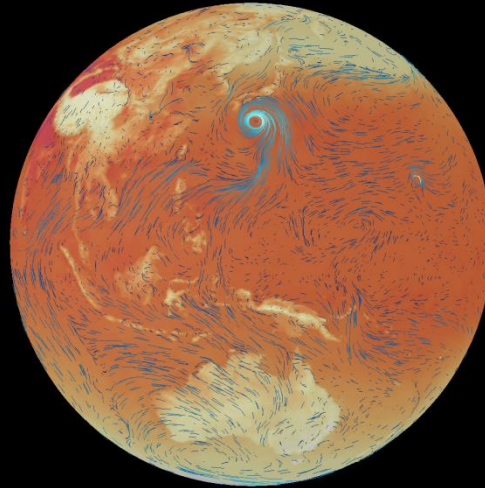
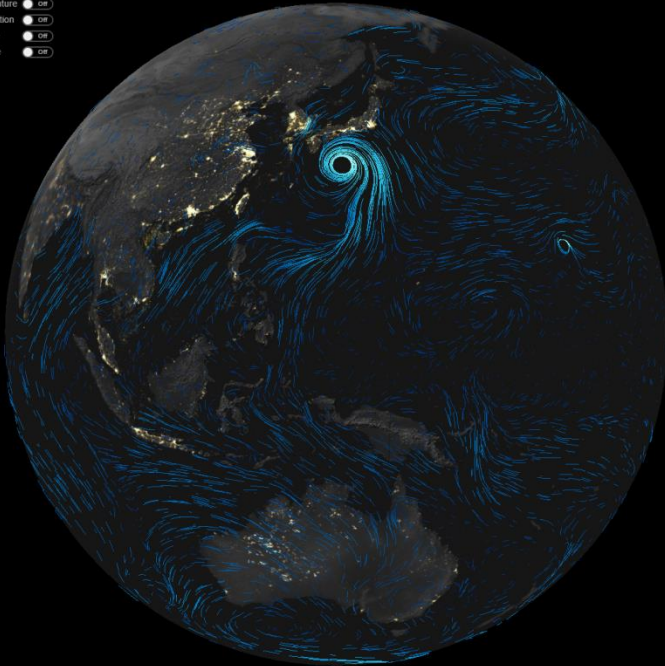
- Visualize global wind over time
- Decrease loading time
- Increase animation performance
- Additional layers
- Mobile device Compatibility
- Incorporate feedback





# Final Product

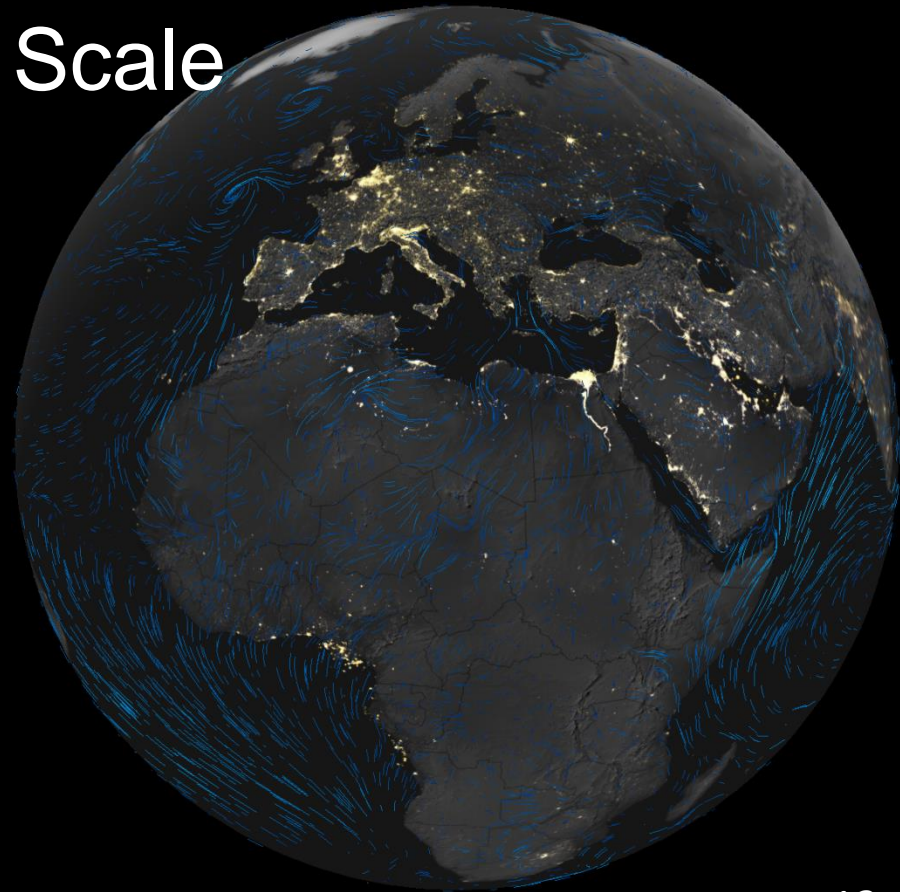
▼ Time Control  
Animate Time  ON  
Change Time 7/16/2015 10:20 AM  
Animate Speed   
▼ Layers  
Global Winds  0 mph 44 mph Info  
Day and Night   
▼ Weather Models  
Temperature   
Precipitation   
Moisture   
Pressure

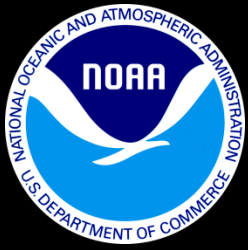




# Summary

- Modern web-based Visualization
- Visualized on a Global Scale
- Updated in real-time
- Easy to understand
- Intuitive User Interface





# Next Steps

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- Public release by NOAA
- Promotion at events like AMS and on Social Media
- Extendable



# Acknowledgements

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- Dan Pisut
- VizLab members
  - Tim Loomis
  - Vivek Goel