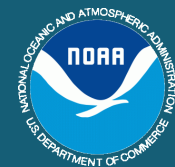


Global Systems Division

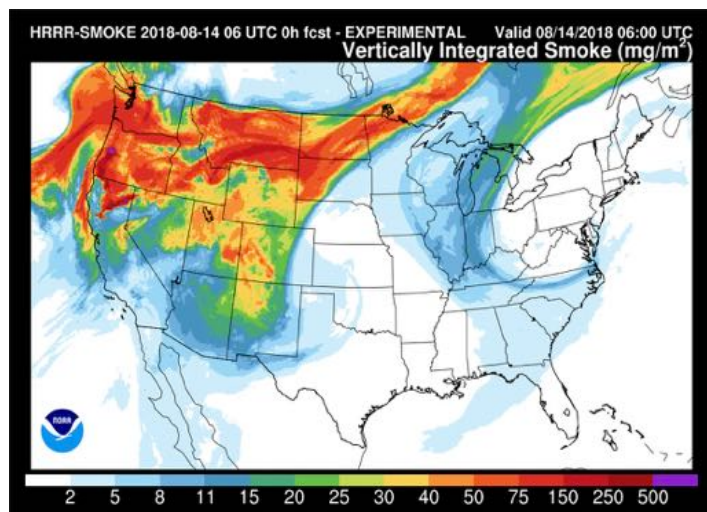
2018 Research Highlights



The NOAA Earth System Research Laboratory Global Systems Division (GSD) researches ways to provide the National Weather Service (NWS) and the public with rapidly-updating environmental models, state-of-the-art decision support tools, innovative visualization systems, and high-performance computing technology to support commerce and a Weather-Ready Nation.

Science on a Sphere team unveils new capabilities

The GSD Science On a Sphere® (SOS) team had an eventful year with two software releases, 11 new SOS installations in five countries, 26 new datasets, and demonstrated new features such as “augmented reality” and a moving “Picture in a Picture” capability. NOAA’s SOS is a room-sized visualization system that uses computers and video projectors and proprietary software developed at GSD to display global data onto a six-foot diameter sphere. SOS Explorer™ is a versatile and portable flat-screen cousin to SOS used in museums and academic institutions.

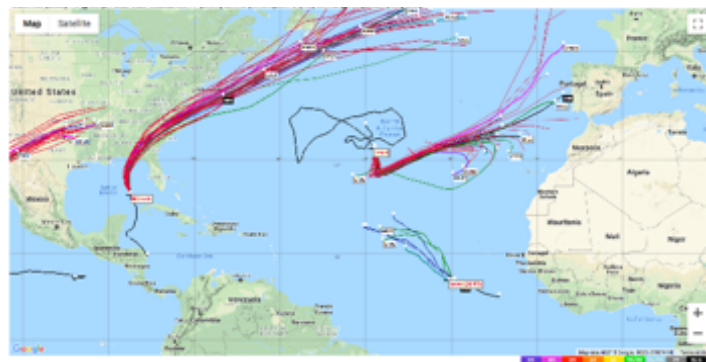


HRRR-Smoke supports western U.S. fire response

The High-Resolution Rapid Refresh-Smoke (HRRR-Smoke) model simulates the emissions and transport of wildfire smoke and is being used by the NWS forecast offices and core partners across the U.S. to support air quality and visibility forecasts. “Core partners can’t be without it here at CalOES SOC (California Office of Emergency Services State Operations Center),” said Bill Rausch, Scientific Operations Officer at the NWSFO in Sacramento, CA. Other users include the National Park Service, transportation companies, and the public.

Experimental hurricane forecast products at your fingertips

GSD developed and manages a webpage that consolidates and displays experimental forecast guidance from the Hurricane Forecast Improvement Project (HFIP) at <http://www.hfip.org/products/>. HFIP experimental research products support NOAA’s forecast services through improved hurricane forecast science and technology. More accurate and reliable forecasts are expected to lead to improved public response, saving life and property



New research improves wind forecasts for the renewable energy industry

New research on wind behavior in complex terrain, led by NOAA and the U.S. Department of Energy, will improve forecasts for wind energy managers by 15-25 percent and improve wind forecasts for the entire country. The Wind Forecast Improvement Project 2, or WFIP2, focused on improving NOAA's short-term weather forecasts of wind speeds in areas such as mountains, canyons, and coastlines, landforms often associated with abundant wind energy potential. The project was based in the windswept Columbia River Gorge in Washington and Oregon, where wind farms can generate as much power as five 800-megawatt nuclear power plants.



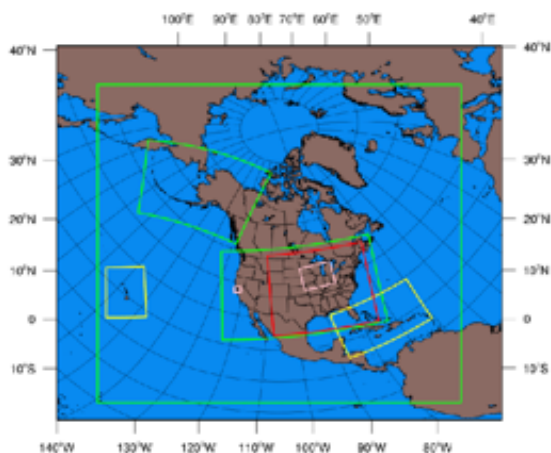
Super high-res model supports cloud and fog forecasts for San Francisco International Airport

GSD developed a special High-Resolution Rapid Refresh (HRRR) "nest" with 750-meter grid spacing over the San Francisco Bay area for the NOAA NWS Aviation Weather Center's Aviation Weather Testbed Summer Experiment. The HRRR nest predicted ceilings and visibility to support flight operations. Better forecasts of when fog will burn off or clouds will lift increases airport capacity and efficiency. The experiment focused on the evaluation of experimental and prototype products and services to support aviation planning in the National Airspace System.



NOAA's short-range model gets upgrade

NOAA's two primary short-range weather models received upgrades developed by GSD researchers in July 2018. The biggest changes will provide more accurate predictions of thunderstorms and flooding potential more than a day in advance. The forecast area also has been expanded to include Alaska, where the primary mode of transportation is aircraft, and predictions of small-scale details on clouds, visibility, and icing are vital for pilot safety. Super-high res versions of the model over the midwest, Hawaii, and the San Francisco Bay area are still experimental.



Hazard Services - Probabilistic Hazard Information application tested by forecasters

The experimental Hazard Services - Probabilistic Hazard Information (HS-PHI) application continues its third year of testing. HS-PHI is a graphical depiction of plumes of probabilities of a severe weather hazard occurring at grid points across a continuum of days to minutes. Forecasters evaluated the performance and usefulness of HS-PHI to convey hazardous weather threats to the public, and provided suggestions to improve the software and helped formulate operational best practices. GSD is developing the Hazard Services framework, and this preliminary version includes the NSSL-developed component PHI.

