Global Forecast System

NOAA's next generation of operational weather and climate models has been upgraded with a Finite-Volume Cubed-Sphere Dynamical Core.

NOAA's flagship operational weather model, the Global Forecast System, or GFS, will now operate with a new dynamical core called the Finite-Volume Cubed-Sphere Dynamical Core (FV3). The core functions as the "engine" of the GFS that will:

Improve model performance and lead to more accurate weather forecasts

Introduce the first version of the Next Generation Global Prediction System

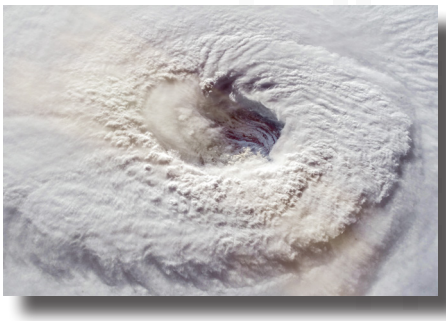
"The FV3 upgrade to our flagship GFS weather model is a considerable advancement and will enable us to better deliver critical forecasts to save lives and property."

-Louis W. Uccellini, Ph.D.
Director, National Weather Service

SCIENTIFIC IMPACT

More accurate precipitation forecasts and prediction of heavy rainfall events

Better temperature predictions and forecasts of weather type



Improvement of tropical system track and intensity

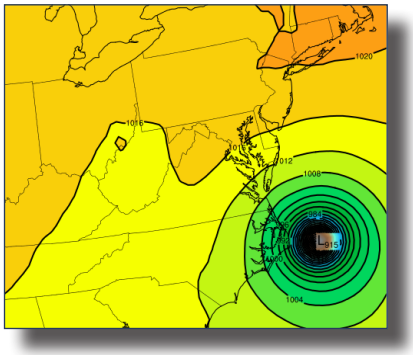
This is the first major upgrade in almost 40 years to the model's dynamical core, which is a key model component that computes wind and air pressure for successful numerical weather prediction.

weather.gov

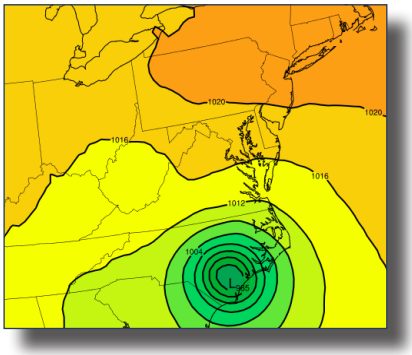
MODELING SUCCESS STORIES

Hurricane Florence Day 4 Forecasts and Analysis

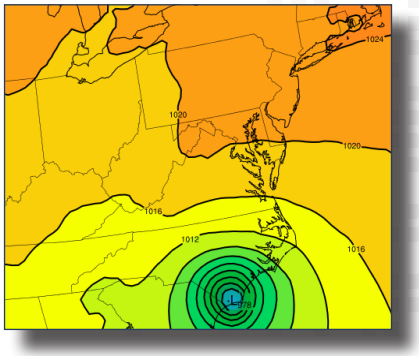
GFS with the FV3 upgrade does not show the erroneous extreme strengthening that the operational GFS shows.



GFS



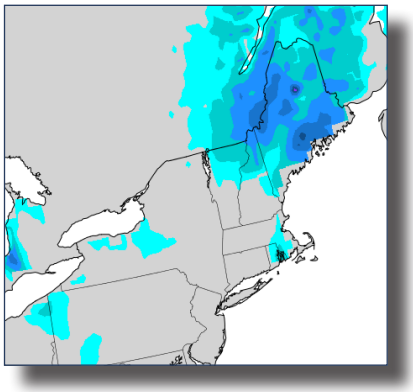
GFS with FV3 upgrade



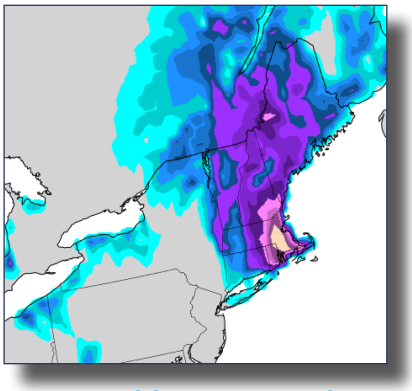
Observed

Day 5 Snowfall Forecasts from the January 2018 "Bomb Cyclone"

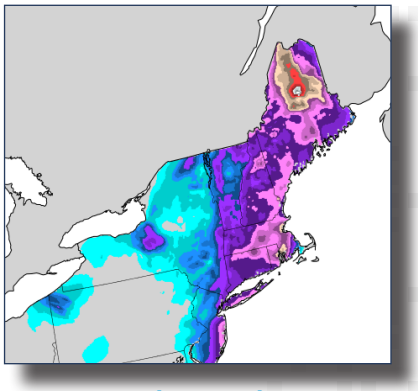
GFS with the FV3 upgrade does a better job showing the threat of a significant eastern New England snow at longer lead times.



GFS



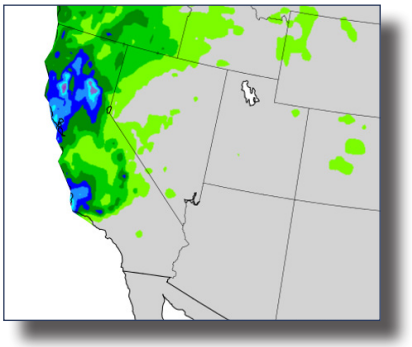
GFS with FV3 upgrade



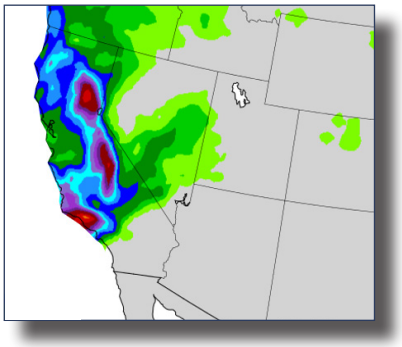
Observed

Day 6 Precipitation Forecast for a West Coast Heavy Rain Event in March 2018

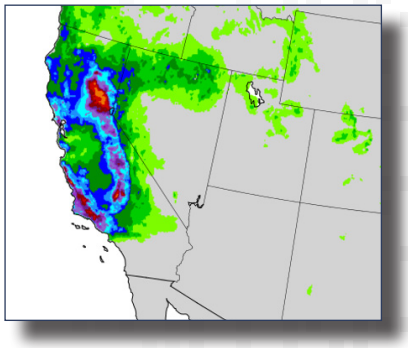
GFS with the FV3 upgrade has a more accurate precipitation forecast.



GFS



GFS with FV3 upgrade



Observed