

## Our Planet

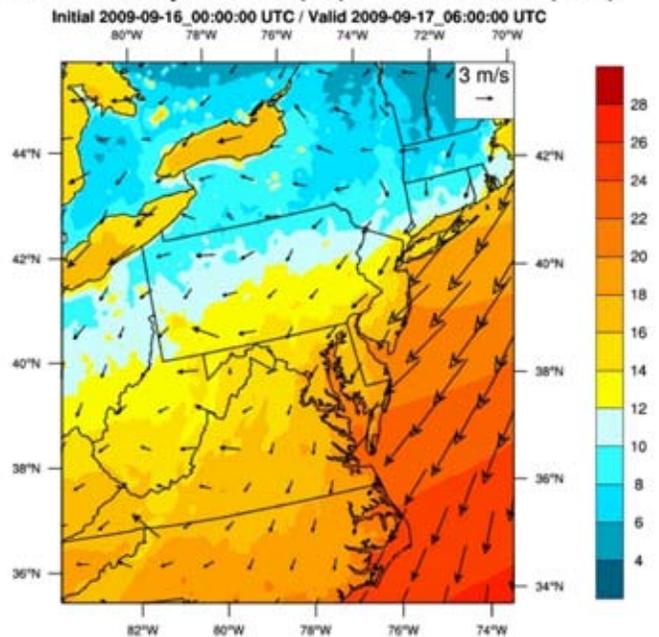
# The Chesapeake Bay Forecast System

The Chesapeake Bay Forecast System (CBFS), now under development at the University of Maryland (UMD) Earth System Science Interdisciplinary Center (ESSIC), is a flexible, end-to-end expert prediction tool for decision-makers that will provide customizable, user-specified forecasts showing multiple aspects of the region's climate, air and water quality, local chemistry, and ecosystems months into the future. Users will be able to configure their own "what if" scenarios and then see the results of specific land-use choices, climate trends, development, demographics, or environmental conditions on particular sections of Chesapeake Bay, which is surrounded by both Virginia and Maryland.

NASA's Discover supercomputer at Goddard Space Flight Center makes it possible for us to run large, long-range (14-day) forecast ensembles at high spatial resolution on a daily basis. We run 20 members every day, each with a spatial resolution of 7.5 kilometers. Such an ensemble approach is necessary to show the amount of forecast uncertainty, since long-range weather forecasts are very sensitive to initial conditions.

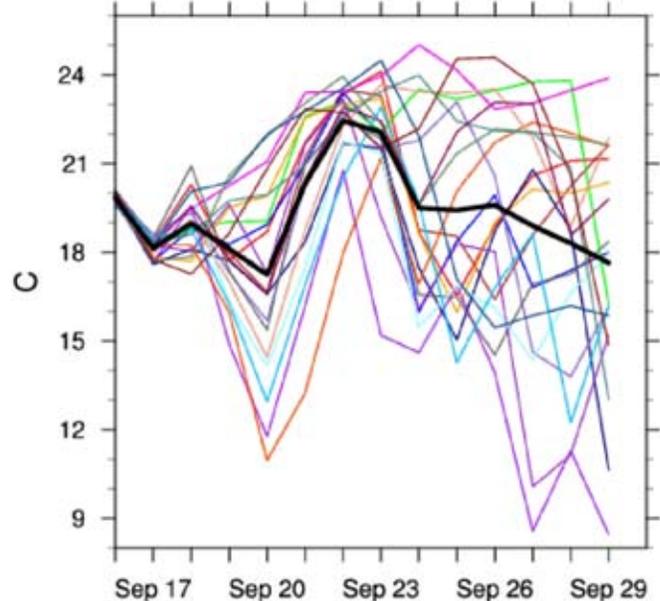
This work has the potential to improve our ability to predict adverse conditions (for example, harmful algal blooms, sea-nettle outbreaks, and pathogen outbreaks) in the Chesapeake Bay on time scales of days to months. Such forecasts would be useful for both recreational and commercial users of the bay (for example, bass fishing). In addition, if our forecast system proves useful, it can be configured for other watersheds and estuaries near which many Americans live and work. Furthermore, this work can be used to predict inundation not only from storm surges, but also from global warming.

### 2-m Air Temperature (°C) / 10-m Winds (m/s)



Twenty-member ensemble mean forecast of temperature and winds.

### Rappahannock Basin Air Temperature



Twenty-member ensemble forecast of daily temperature in the Rappahannock Basin. The heavy black line shows the ensemble mean.

<http://www.climateneeds.umd.edu/chesapeake/>

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