



PACE Applications

Ecological Forecasting
Harmful Algal Blooms

How can we better understand the causes and impacts of **Harmful Algal Blooms**, and how can we improve routine monitoring and ecological forecasting of HABs using ocean observations from space?

Who Cares and Why?

Coastal harmful algal bloom (HAB) events have been estimated to result in economic impacts in the United States (US) of at least \$82 million each year. The impacts of HABs range from **environmental** (e.g., alteration of marine habitats and impacts on marine organisms), **human health** (e.g., illness or even death through shellfish consumption, asthma attacks through inhalation of airborne HAB toxins), to **socio-economic** (e.g., commercial fisheries, tourism, recreation).



US federal, state, and local agencies, increasingly require improved water quality observations to monitor and understand HAB events. To protect human health and the environment, it is imperative to provide user communities with predictive warnings so they can adequately plan and respond to the adverse effects associated with HABs.



The NASA Response

PACE Ocean Color Instrument (OCI)



- * 5nm hyperspectral resolution
- * UV (345 nm)- SWIR (2260 nm)
- * 1-2 day overpass
- * 24 hr data latency
- * 1 km at nadir

PACE OCI will enable algorithm development for identifying and quantifying specific **phytoplankton groups**, thus identifying and tracking HAB evolution and variability over seasonal to interannual time scales.

Combining advanced modeling methodologies with high-quality PACE ocean color imagery and ancillary observations from various platforms will allow us to vastly improve **ecological forecasting** of the location and extent of HABs.



Plankton, Aerosol, Cloud, ocean Ecosystem