

ECCO

Estimating the Circulation and Climate of the Ocean

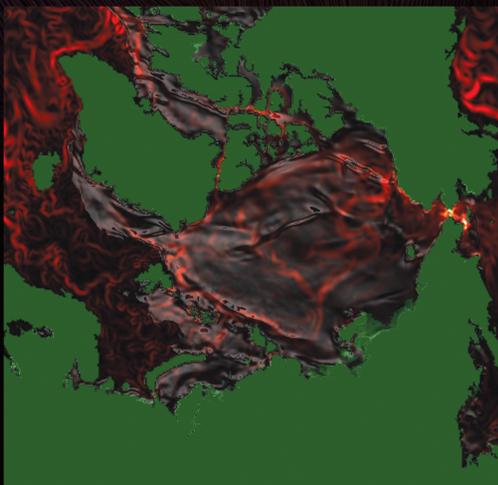
NAS Supercomputers Improve Estimates of Ocean Climate

Researchers at the NASA Advanced Supercomputing (NAS) Facility have teamed up with the Jet Propulsion Lab (JPL) to dramatically accelerate the development of a highly complex and unique model of the Earth's oceans.

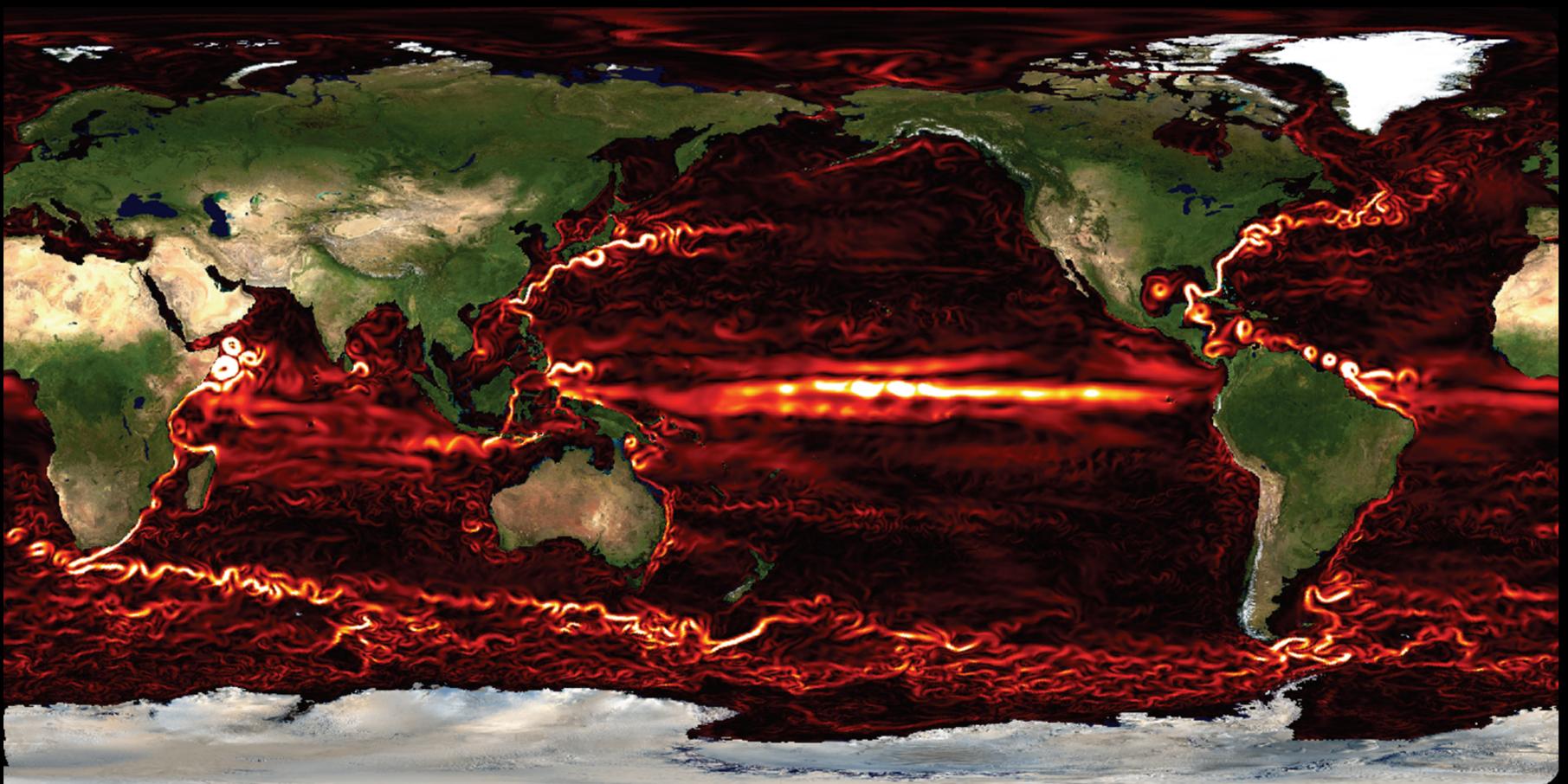
The ECCO (Estimating the Circulation and Climate of the Ocean) team produces time-evolving, three-dimensional estimates of the global state of the ocean in near-real time. These estimates are obtained by incorporating into the model vast amounts of data—such as sea level, current speed, surface temperature, and salinity—which are gathered from instruments in the ocean and from space satellites like NASA's TOPEX/Poseidon and JASON.

Scientists use these realistic, time-evolving estimates as a practical tool to better understand how the ocean currents affect Earth's climate, to study the role of the ocean in the Earth's uptake of carbon dioxide, and more accurately predict events like El Niño and global warming.

By using the NAS Facility's most powerful supercomputers, researchers now get results in a few months that previously took several years to obtain. The NAS team also supports the ECCO project by solving technical issues such as data transfer and storage, and has developed new methods to allow scientists to visualize their results.



Ocean current speed (red) and sea ice (transparent glaze) viewed from straight above the north pole, at center. Land masses are shown in green, with Greenland at upper left.



Several large ocean currents and eddies (red), with bright white showing the fastest current speed: At right, the Gulf Stream winds its way from South America up along the East Coast of the U.S.; the Kurushio Current off the coast of Japan; and the Antarctic Circumpolar Current (bottom). White areas at the poles depict land ice. Land masses are overlaid with NASA satellite imagery.