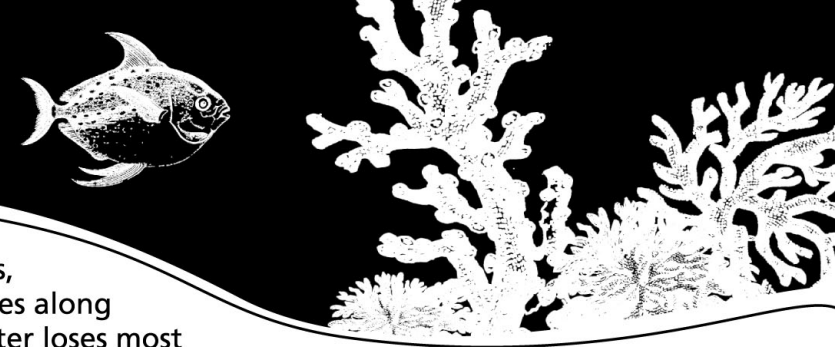


The Ocean and Climate



The oceans cool and warm the Earth by redistributing the Sun's energy. Near the tropics, where the Sun shines strongly, the oceans take in heat and transport it to higher latitudes along major surface currents, such as the Gulf Stream. During its journey to the poles, this water loses most of its heat. At the poles, the now colder, denser waters sink below the surface and move in deep currents toward the Equator. Heated again by the Sun, they rise and move back toward the poles. And so the cycle goes, creating a natural balance.

This balance between hot and cold is constantly changing. Glaciations and warmer interglacial periods have alternated through the ages. The effects of climate variations have always been felt at the human scale.

Winds are closely linked to high and low pressures in the atmosphere and are themselves modified by ocean-atmosphere heat exchanges. Forecasting ocean conditions enables us to predict what the weather will be like next summer: dry or wet, hot or cold, etc. The oceans are also affected as sea levels rise and fall in response to these fluctuations.

A permanent, global view of the oceans and their movements is vital for us to predict climate variations and their socio-economic impacts. Satellites give us the tool we need to make these long-term, global observations. In particular, altimetry satellites such as Topex/Poseidon and Jason-1 enable us to measure and monitor sea level changes and gain a closer insight into the processes of ocean circulation.



Climate Research

By modeling changes in the distribution of heat in the ocean, scientists can study patterns of evaporation and precipitation in the Earth's water cycle and can use those models to study the tie between ocean state and climatic conditions.

Hurricane Forecasting

Altimeter data are incorporated into atmospheric models for hurricane season forecasting and individual storm severity.

Marine Animal Research

Sperm whales, fur seals, sea turtles and other marine animals can be tracked and studied around ocean eddies where nutrients and plankton are abundant. Changes in water temperature and circulation patterns can significantly alter the habitats of these sea creatures. Altimeter data of the oceans can track these conditions and give scientists the tools they need to study the effects.

El Niño & La Niña Forecasting

Understanding the pattern and effects of climate cycles such as the El Niño Southern Oscillation (ENSO) is a primary goal of the Topex/Poseidon and Jason-1 missions.