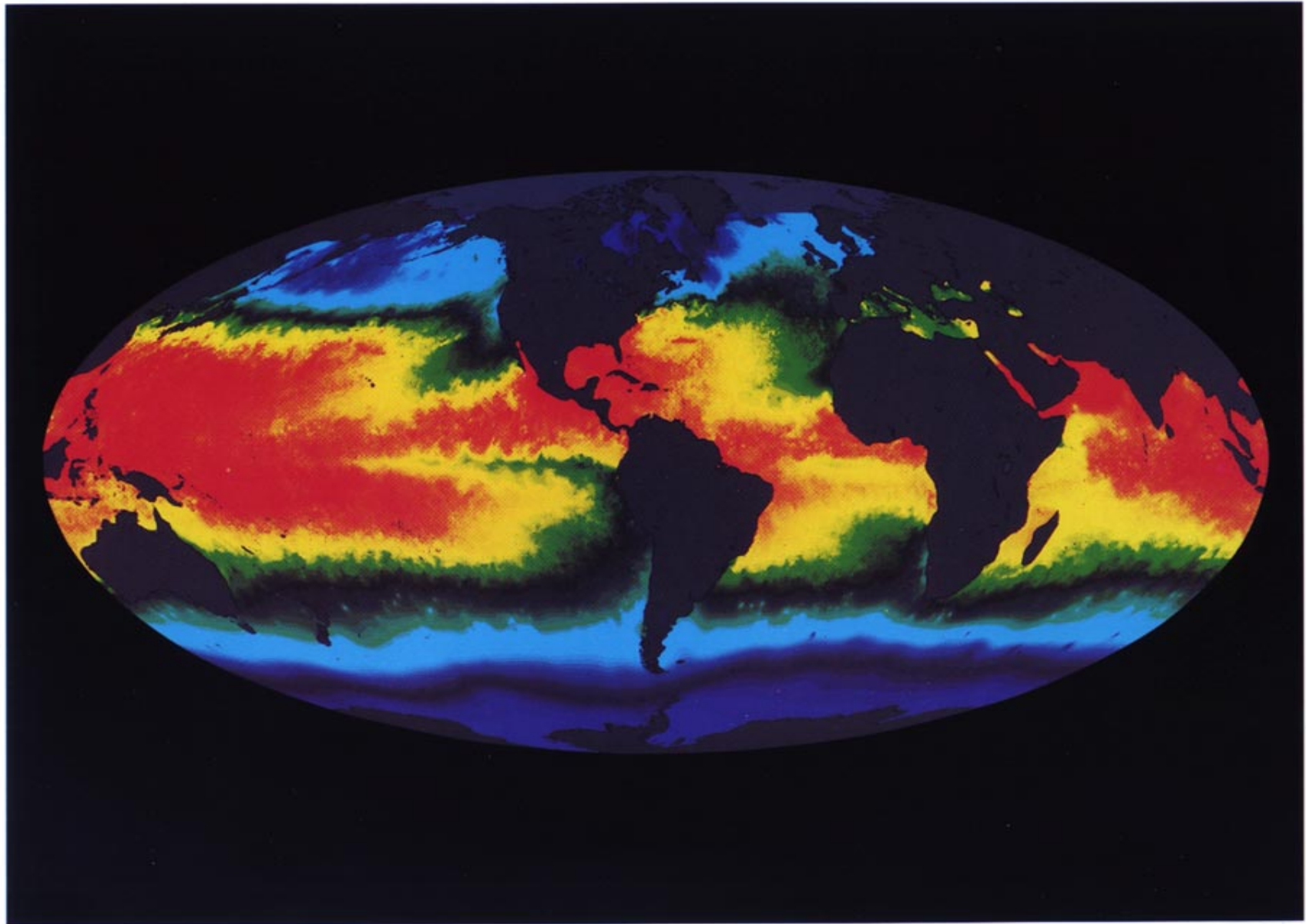




National Aeronautics and  
Space Administration  
Goddard Space Flight Center

## Global Sea Surface Temperature





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This illustration of Earth's sea surface temperature is part of NASA Goddard Space Flight Center's program of Earth-science research. It was obtained from two weeks of infrared observations by the Advanced Very High Resolution Radiometer (AVHRR), an instrument on board NOAA-7 during July, 1984.

Temperatures are color coded with red being warmest and decreasing through oranges, yellows, greens, and blues.

Temperature patterns seen in this image are the result of many influences including the circulation in the ocean, surface winds, and solar heating. Major ocean currents such as the Gulf Stream off the United States East Coast, the Kuroshio off the East Coast of Japan, the mixing of the Brazil and Falkland currents off the eastern coast of South America, and the Agulhas off southern Africa, appear as meandering boundaries of cool and warm waters.

The image indicates a large pool of water in the Western Pacific and a tongue of relatively cold water extending along the Equator westward from South America. Every few years, there occurs an interrelated set of changes in the global atmospheric and oceanic circulation known as an El Niño in

which the region of warm equatorial water in the west extends eastward across the Pacific and blankets the cool, productive regions along the coast of South America. Fish, birds, and marine mammals that depend upon the normally phytoplankton-rich waters often die in large numbers during El Niño.

Images of sea surface temperature such as this help scientists to better monitor and ultimately understand the changes to Earth caused by events such as El Niño.

This study is part of NASA's multiyear global research program called Mission to Planet Earth. It will use ground-based, airborne and space-based instruments to study Earth as a complete environmental system. Mission to Planet Earth is NASA's contribution to the U.S. Global Change Research Program, a multi-agency effort to understand, analyze, and predict better the effect on human activity on Earth's environment. Goddard Space Flight Center's projects for Mission to Planet Earth include: the Upper Atmosphere Research Satellite Mission; Earth Probes, such as the Tropical Rainfall Measuring Mission; the Total Ozone Mapping Spectrometer; and the most ambitious science mission ever undertaken, the Earth Observing System.

#### For the Classroom Research Topics:

- El Niño
- Upwelling
- Major ocean currents
- Mission to Planet Earth

1. Have students, individually or in teams, consult the Reader's Guide to Periodical Literature and compile a bibliography of articles dealing with different facets of Mission to Planet Earth (ocean temperatures, international cooperation, etc.).
2. John Muir, an American Naturalist, once said "When we try to pick out anything by itself, we find it hitched to everything else in the universe."

Using this statement as a writing prompt, have students explain its meaning and how it can be applied to the goal of Mission to Planet Earth.

3. Using this lithograph and a labeled world map, have the students list countries influenced by cool currents and list ways in which these countries might be affected by these currents.