Earth's climate and the circulation of deep ocean currents are strongly influenced by the saltiness of the sea surface. So why don't we have detailed maps that show its rapid changes? Well, now we do. After more than a year of continuous measurements, NASA's Aquarius instrument aboard the Aquarius/SAC-D spacecraft has given us this new space-based view of sea surface salinity. A closer look at the data reveals some fascinating features. Our focus first turns to a salty patch of water in the North Atlantic Ocean. Evaporation of water from the sea surface leaves behind large amounts of salt that contribute to the active zone of high salinity water seen here. Conditions are different in the North Pacific Ocean. Near the equator, in one of the wettest regions on the planet, heavy rainfall adds an abundance of water to the sea surface. This results in the dark-blue band of low salinity water off the coast of South America and Central America. Rivers can also influence the amount of salt on the sea surface. Every second, millions of gallons of fresh water flows from the Amazon River into the Atlantic Ocean. The effect of this is a sinuous plume of low salinity water that extends from the mouth of this great river. At high latitudes, the seasonal melting of sea ice causes a sharp decrease in sea surface salinity. We see examples of this in the Labrador Sea and the coastal waters that surround Greenland. In spring and summer, surface currents transport the low salinity water south, where it meets warmer and saltier water carried north by the Gulf Stream. The contrasting patches of high salinity water to the west and low salinity water to the east of the Indian subcontinent are due to a combination of geography and climate. To the west, an arid climate and lack of freshwater input yields the salty waters of the Arabian Sea. To the east, monsoon rains and freshwater outflow from the Ganges River keep the Bay of Bengal far less salty. Without satellite observations, these global changes would be largely invisible to us. Ongoing measurements by Aquarius will help scientists better understand our vast oceans and how changes to ocean circulation and the transport of water through the atmosphere may impact Earth's climate.