The motion in our ocean is tied to... salt! Perhaps surprisingly, this everyday substance is also tied to seawater temperature, density, and climate. The NASA instrument on the Aquarius/SAC-D satellite—a partnership with Argentina’s space agency, CONAE—will detect changes in the concentration of salt at the ocean surface equivalent to a “pinch” (about 1/8 teaspoon) of salt in a gallon of water! The Aquarius instrument’s accuracy is 0.2 practical salinity units (psu); one psu is equal to about one part per thousand.

Sea surface salinity

One key role that salt plays is helping to drive ocean circulation. How? Movement at the surface of the ocean is primarily forced by winds. But below depths of about 1 kilometer (0.6 miles), salinity and temperature set ocean currents in motion. Together, these affect the density of the water, controlling whether ocean currents sink deeper, rise shallower, or move horizontally.

Temperature

Since most of the solar energy Earth receives is near the equator, tropical latitudes are generally warmer and colder temperatures occur near the poles. When we think of climate, we tend to focus on air temperature and atmospheric currents. However, because water stores and moves heat much better than air, the ocean has a major influence on climate. Without ocean circulation, our planet would be no place to live!

Density

Ocean circulation is in large part dependent on changes in water density, which is determined by salinity and temperature. Cold, high-salinity water masses are relatively dense and tend to sink. Warm, low-salinity water masses are relatively buoyant and tend to “float.” Differences in sea surface density trigger the currents that distribute solar energy and regulate Earth’s climate.

As the water cycle changes, so does sea surface salinity!

http://aquarius.nasa.gov