# Tropical pycnostads and bottom boundary layers

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In each of the three oceans, marked short vertical scales in Brunt-Vaisala frequency are observed within the equatorial deformation radius, as observe don meridional hydrographic sections with close station spacing across the equator (10 to 20 nm). (Most of the sections considered here were collected as part of WOCE.) The vertically-alternating pycnostads and pycnoclines are coherent meridionally and are probably associated with the equatorial stacked jets, extending to the ocean bottom. Pacific sections at 152W and 135W closely resemble each other despite their temporal/spatial separation; along-isopycnal stability minima within 1.5 degrees of the equator are centered at about 600 m, 1300 m, 2200 m, 3100m, and close to the bottom, separated vertically by layers of lateral stability maxima. Similar features are seen in the eastern Pacific between the Galapagos and South America, but centered at 1-2S instead of at the equator.

Within 2° of the equator the bottom mixed layer is also much better mixed than off the equator, on sections from central and eastern longitudes in all three oceans. The equatorial. Bottom layer is approximately 300 m thick. In the Pacific the separation between this bottom layer and the overlying Pacific Deep Water has been termed the benthic front; the well-mixed bottom layer coincides with a meridional isopycnic maximum in silicate. The bottom mixed layer in the far eastern Pacific is likewise about 300 m thick, but is warmer since the bottom is shallower. In the Atlantic section at 25°W, the Mid-Atlantic Ridge creates shallow water just at the equator; nevertheless there is a well-defined bottom boundary layer about 300 m thick at the equatorial stations. The equatorial bottom boundary layer on the Indian Ocean sections is also about the same thickness, but is less obvious than in the Pacific and Atlantic because of the large-scale northward slope of the bottom into which near-bottom isopycnals plunge.

The plunging of abyssal isopycnals into the bottom is seen to be a ubiquitous feature of the quiet parts of the circulation at all latitudes and in all oceans, and is accompanied by the varied abyssal currents along deep ridges and around deep basins.