



## **The Stokes drift in long baroclinic equatorial Rossby waves**

Jan Erik H Weber

Norway (j.e.weber@geo.uio.no)

The Stokes drift in long baroclinic equatorial Rossby waves is investigated theoretically by using eigenfunction expansions in the vertical. These waves are non-dispersive and propagate westward along the equator. Particular attention is paid to the first baroclinic, first meridional Rossby wave mode which has been observed in the equatorial Pacific. It is demonstrated that the Stokes drift depends very much on the depth-variation of the Brunt-Väisälä frequency. Even more importantly, it is found that, for arbitrary stable stratification, the total zonal Stokes volume transport induced by the Rossby wave mode (1,1) is identically zero. The eastward drift due reflected wave energy in the form of internal equatorial Kelvin waves is also addressed. Due to the very long period of the incident Rossby wave mode (1,1), the reflected equatorial Kelvin wave must at least be a 2. mode component in the vertical. The corresponding Stokes drift only induces a minor change near the surface of the total westward drift velocity at the equator. The implication for the existence of compensating Rossby rip currents along the equator is discussed.