The winter circulation in the Gulf of Tehuantepec is characterized by the generation of large mesoscale eddies by intense wind pulses. These winds blow through a mountain pass across the Tehuantepec Isthmus to fan out over the Mexican Pacific in the center of the Gulf of Tehuantepec [Barton et al., 1993]. *In situ* observations reported by Trasviña et al. [1995] reveal strong cooling below the axis of the wind, accompanied by the development of an offshore current jet that quickly evolves into a large anticyclonic eddy. This drastic lowering of the sea surface temperature is not caused by upwelling. Although the thermocline intersects the surface, it does so below the axis of the wind, not below the region of maximum wind stress curl which occurs to the left of the wind maximum (looking downwind). This cooling is produced by intense stirring induced by the vertical shear of the currents driven by the wind [Trasviña et al., 1995]. The presence of a shallow thermocline depth (20 to 50 m) throughout the southern Mexican Pacific enhances the signature of this phenomenon in the thermal imagery. More recently, Trasviña et al. [2003] describe the subduction of the heavy surface water mass to form a thermostad or intrathermocline lens in the flank of the eddy. Their drifter observations also show that these eddies propagate offshore at about 9 $km.d^{-1}$, initially southwestward and later more westward. Their sea-level signature can be tracked as far as 140°W before it disappears during the summer, coinciding with the strengthening of the North Equatorial Countercurrent. The large-scale impact of these features is established by Giese, Carton and Holl [1994] in a study of the variability of sea level over a year of TOPEX altimetry data for the Eastern Pacific. After removing the annual harmonic, they found a band of mesoscale activity between 10 and 120°N extending from 120°W to the coast. They show this clearly to be produced by offshore propagating eddies formed off the gulfs of Tehuantepec, Mexico and Papagayo, Nicaragua. Palacios and Bograd [2005] analyze 12 years of altimetry data for the region. They report that, on average, the eddy season begins in late October and lasts approximately 250 days until early July. These authors report a mean of 3.5 Tehuantepec and 2.2 Papagayo eddies formed each year. Trasvina & Barton [2006] report the generation of dipolar structures in the summer using drifter and altimetry data. They are characterized as the linear response to the more gentle summer offshore winds. This dipolar structure is transitory though, and only the anticyclonic eddy survives while erratically propagating offshore at about 2 to 8 $km.d^{-1}$.

A. Trasvina & E.D. Barton. June, 2006

References

1. Barton, E.D., M.L. Argote, J. Brown, P.M. Kosro, M. Lavin, J.M. Robles, R.L. Smith, A. Trasviña, H.S. Vélez (1993). Supersquirt: Dynamics of The Gulf of Tehuantepec, Mexico. *Oceanography, Vol. 6*, No. 1, pp. 23-30.
2. Giese, B., Carton, J. and Holl, L. (1994). Sea level variability in the eastern tropical Pacific as observed by TOPEX and Tropical Ocean--Global Atmosphere Tropical Atmosphere--Ocean Experiment. *Journal of Geophysical Research 99(C12)*: doi: 10.1029/94JC01814. issn: 0148-0227
3. Palacios D. M., S. J. Bograd (2005). A census of Tehuantepec and Papagayo eddies in the northeastern tropical Pacific. *Geophys. Res. Lett., 32*, L23606, doi:10.1029/2005GL024324.
4. Trasviña A., E.D. Barton, H.S. Velez and J. Brown (2003). Frontal subduction of a cool surface water mass in the Gulf of Tehuantepec. *Geofísica Internacional, Vol. 42*, No. 1, pp 101-114.
5. Trasviña, A., E.D. Barton, J. Brown, H.S. Vélez, M. Kosro and R.L. Smith (1995). Offshore Wind Forcing in the Gulf of Tehuantepec, Mexico: the asymmetric circulation. *Journal of Geophysical Research, OCEANS, Vol. 100*, No. C10, 20649-20663.
6. Trasviña and E.D. Barton (2006). Summer Mesoscale circulation in the Mexican Tropical Pacific. Submitted to the *Journal of Geophysical Research* (February 2006).