Is There Really an Intermittent Biennial Oscillation in the Great Plains Low-Level Jet over Texas?

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In the 15-year GEOS-1 reanalysis data set, a maximum of interannual variance of low-level meridional flow for the warm season (May through August) occurs over southeast Texas. This variance maximum seems to be dominated by a marked biennial oscillation that occurs only during the first 6 (or possibly 8) years of the reanalysis period (1980-85 or possibly 1980-1987) and then completely disappears by the 9th year. This biennial oscillation seems to be associated with interannual fluctuations in ground wetness, surface temperature and surface pressure gradients over Texas. The periods of drier soil lead to warmer surface temperatures, lower surface pressures, stronger pressure gradients between Texas and the Gulf of Mexico and stronger southerly winds.

This intermittent biennial oscillation is also evident in corresponding fields for the the NCEP/NCAR reanalysis data set for the years 1978-1985 (and possibly from 1978-1987) and 1995-2000, but not during other periods. There are also obvious biennial oscillations evident during these periods in U. S. Climate Division records for the Palmer Drought Severity Index (PDSI) for Texas. Month-by- month correlations of this index with certain El Nino related indices are as high as .45 for the first period and as high as .55 or .6 for the second period for some regions in Texas.

The seasonal cycle of the biennial signal in the PDSI and precipitation for the first period suggest that the drought in Texas and Mexico is ended (caused) by a reversal in the sign of anomalies in precipitation rate for the fall/winter season. Analysis of tropical Pacific SST patterns shows a .5 to .75 K biennial oscillation of SSTs along the precipitation-free track to the southwest of the Mexican coast during the fall and winter months of the 1978 to 1985 period that might explain the reversal in precipitation anomalies and hence the entire intermittent biennial oscillation in ground hydrology and low-level flow.