The low-latitude troposphere response to El Niño-Southern Oscillation (ENSO) events during 2006-2009 has been observed by FORMOSAT-3/COSMIC. Variations of troposphere temperature, pressure and water vapor within latitude ±5° reveal that due to the air–sea interaction, the Pacific basin-wide ENSO warm begins to grow during northern hemisphere Summer, then crosses the 180°E, and expands to eastern Pacific in the northern hemisphere Winter. On the other hand, four indices are derived from the F3/C tropopause height, pressure, temperature, and potential temperature based on a standard SOI (Southern Oscillation Index) and Niño3.4 index. The derived indices as well as the SOI and Niño3.4 yield a good agreement. The results predict that it shall be a strong ENSO warm event in 2009-2010.