

# Decadal variations and trends in tropical Pacific SSS since 1970

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This study documents and interprets 1970-2003 observed tropical Pacific Sea Surface Salinity (SSS) changes in three key regions: the western Pacific Warm Pool (WP), the South Pacific Convergence Zone (SPCZ), and the Equatorial Cold Tongue (ECT). A PDO-like signal shows up in these three regions, with some shifts in SSS appearing around the mid-1970s, mid-1990s, and to a lesser extent in 1989-1990 (Figure 1). In addition, a clear freshening trend of the order of 0.1 to 0.3 pss per 30 years appears in the WP, SPCZ and ECT, together with an extension of the low-salinity waters surface in the WP and SPCZ (not shown here). Based on available precipitation (P) and evaporation (E) products, and on a survey of the published literature, the PDO-like SSS changes are found qualitatively consistent with P and E, and/or horizontal and vertical salt advection in the WP and the SPCZ. The repercussions and unsolved issues regarding the SSS decadal changes and freshening trends are discussed.

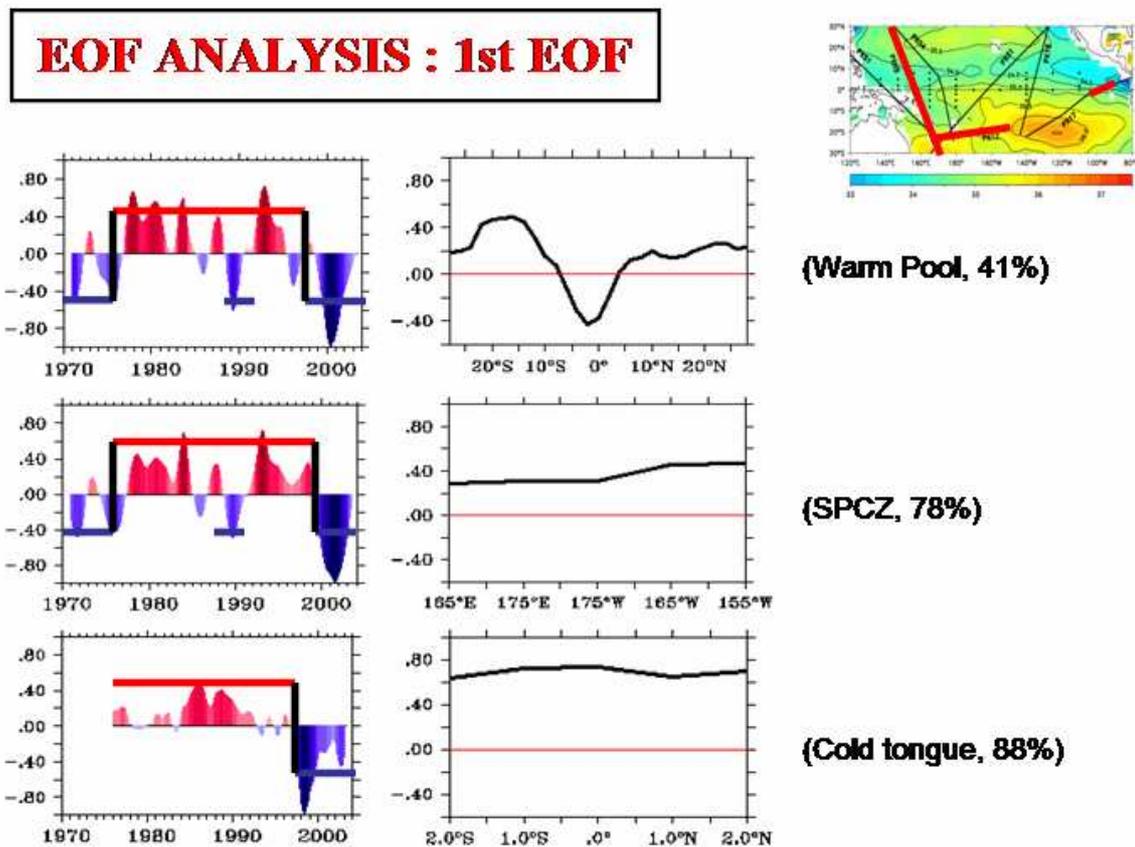


Figure 1.. Time functions (left panels) and spatial patterns (right panels) of the first EOF for SSS along the PX05 (warm pool, top panels), PX12 (SPCZ, middle panels) and PX17 (cold tongue, bottom panels) mean shipping lines. Ship lines are reported as heavy red lines in the small upper-right figure reporting SSS contours in the tropical Pacific. Units for the EOF are defined so that the product between spatial pattern and time function represents pss. The heavy red and blue lines on the left panels are a schematic of the Pacific Decadal Oscillation (PDO) time series. Note the different longitude and latitude scales for the spatial patterns. (Adapted from Delcroix et al., 2007).