



## **Tropical indo-pacific mean state and ENSO variability: learning from the past to investigate climate change scenarios**

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The present study aims at analyzing from past observations various aspects of ENSO variability in order to evaluate how coupled models do represent such a variability and its potential changes under climate change conditions.

In a first step, we investigated the ENSO phenomenon during the recent 1955-2002 at the Indo-Pacific basin scale. To that end, we selected two data sets (ERSST and HADISST) that present coherent spatial patterns and behaviors. A change in the transitions between El Niño and La Niña extreme events after 1980 is highlighted.

By using statistical methods to study more precisely the evolution of the mean state of the Indo-Pacific basin during the last fifty years, it is shown that the warming observed since 1955 does not occur as a trend but as an abrupt change during the middle of the 1970's and mainly in the South Pacific and the western part of the basin. We find that although the surface of waters warmer than 28C has not significantly been modified, the areas of waters warmer than 28.5C and 29C have significantly expanded towards the east at the equator (by 10 to 15 longitude) and toward the south-east in the South Pacific. Such an expansion of the warmest waters increases the equatorial zonal gradient of SST which is likely to impact the convective activity and to increase the equatorial Pacific sensitivity to westerly wind activity. Such a study should be followed by an analysis of AGCM sensitivity to such changes in SST patterns.

Then those diagnostics are applied on results of simulations, those from IPSL within the framework of IPCC scenarios of climatic change. This allows us to evaluate those simulations with respect to observations and to test the evolution of the characteristics of ENSO events in the context of climate change.