Possible scenario for Mesoamerican and Caribbean region under Climate Change

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SPSAS Climate Change

Abstract

Various factors affect the Climate of Mesoamerican and Caribbean region, those are mainly Tropical cyclones, easterly waves and Caribbean low-level jet (CLLJ).

CLLJ (**Fig. 1 and Fig. 2**) is a key element of the Mesoamerican Climate. Its intensification during July produces a westward displacement of the Inter-Tropical Convergence Zone (ITCZ) over the eastern Pacific that results in the Mid-Summer Drought (MSD), **Fig. 3 and Fig. 4**.

This study is centered to show the different types of variability of Caribbean low-level jet, these were obtained with a minimum covariance method. Then, the Southern Oscillation Index (SOI) is compared for each year, **Fig. 5 and Fig. 6**. SOI is a standardized index based on the observed sea level pressure differences between Tahiti and Darwin, Australia. Prolonged periods of negative (positive) SOI values coincide with abnormally warm (cold) ocean waters across the eastern tropical Pacific typical of El Niño (La Niña) episodes.

Is important to emphasize the role of El Niño-Southern Oscillation (ENSO) as surely the most strong dynamical forcing for the study phenomena.

Although all force model experiments agree in predicting a substantial warming in the eastern tropical Pacific, large model uncertainty still exists with respect to the future behavior of climate in the low latitudes.

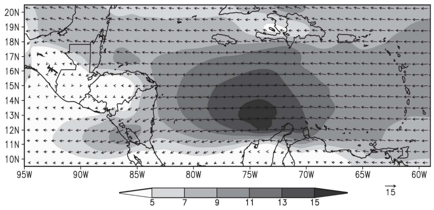


Fig. 1 *Vector Wind in **July**, climatology (1979-2016) ERA-Interim data.*

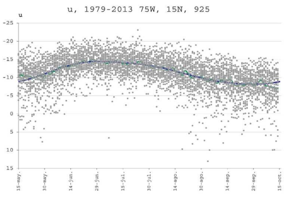
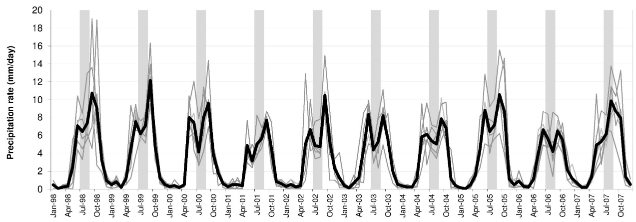


Fig. 2 *Variability of summer zonal wind (ms^{-1}) at 925 hPa, in July.*



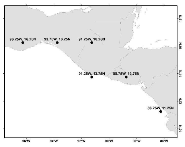


Fig. 3 *Mean monthly GPCP precipitation rate (mm/day) for the 1998 – 2007 period at six grid points: (96.25°W, 16.25°N), (93.75°W, 16.25°N), (91.25°W, 16.25°N), (91.25°W, 13.75°N), (88.75°W, 13.75°N), (86.25°W, 11.25°N) (thin lines), and its spatial average (thick solid line). Grey bars correspond to July-August period.*

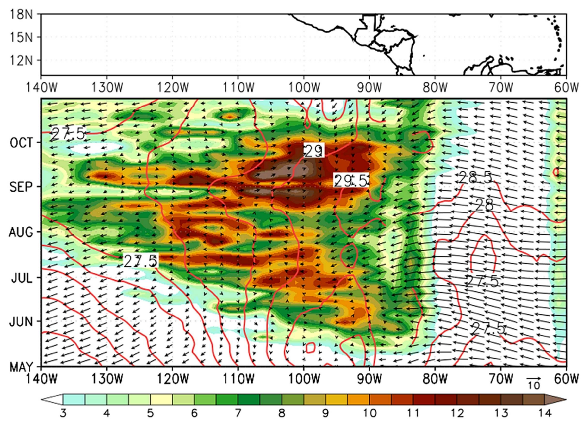


Fig. 4 *Hovmöller diagram of the climatology of pentad precipitation (mm/day), weekly sea surface temperature (°C) red lines, and 925hPa weekly winds averaged between 12.5°N and 15°N from 140°W to 60°W.*

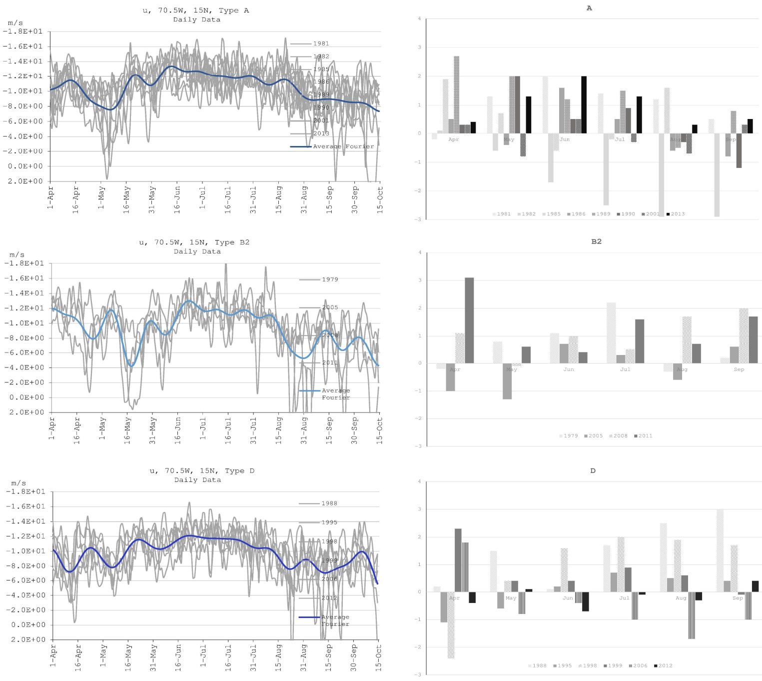


Fig. 5 *Three different types of zonal velocity variability (left column) associated with La Niña SOI (right column).*

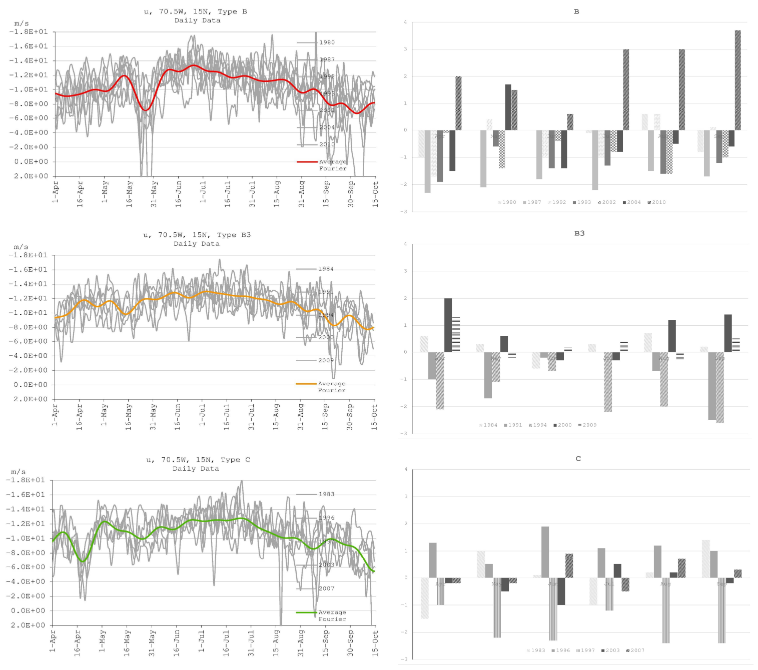


Fig. 6 *Three different types of zonal velocity variability (left column) associated with El Niño SOI (right column) for the first two and a neutral type (C) in the bottom.*

References

1) Herrera, E., V. Magaña, and E. Caetano, (2014). Air–sea interactions and dynamical processes associated with the midsummer drought. *Int. J. Climatol.* **35**: 1569-1578. doi: 10.1002/joc.4077

2) Paeth, H., A. Scholten, P. Friederichs, and A. Hense, (2008). Uncertainties in climate change prediction: El Niño-Southern Oscillation and monsoons. Global and Planetary Change 60, 265-288.