



A longitudinally explicit, multivariate probabilistic framework for tracking the Intertropical Convergence Zone on seasonal to multi-decadal scales

Antonios Mamalakis (1) and Efi Foufoula-Georgiou (1,2)

(1) University of California, Irvine, Civil and Environmental Engineering, Irvine, United States (amamalak@uci.edu), (2) University of California, Irvine, Earth System Science, Irvine, United States

Due to its importance for water availability in the tropics and subtropics, efficient tracking of the Intertropical Convergence Zone (ITCZ) on seasonal to multi-decadal scales is of great value. Current approaches which are based on tracking changes in the annual mean of single variables (like precipitation) do not provide insight into the seasonal dynamics of the ITCZ, while more sophisticated methods are computationally intensive. In our study (Mamalakis and Foufoula-Georgiou, 2018), we propose a new probabilistic framework to track the ITCZ, which is based on jointly tracking the location of maximum precipitation and minimum outgoing longwave radiation in narrow overlapping longitudinal windows. Our framework is seasonally and longitudinally explicit, allows for joint consideration of multiple variables to define the ITCZ, and is flexible in its implementation, thus, it can be used in analyses of different scales and scopes. We apply our framework to analyze the recent climatology of the ITCZ and detect past trends in its dynamics since the mid 20th century. We reveal a statistically significant southward trend in the location of the ITCZ over the central Pacific.

Reference: Mamalakis, A., & Foufoula-Georgiou, E. (2018). A multivariate probabilistic framework for tracking the intertropical convergence zone: Analysis of recent climatology and past trends. *Geophysical Research Letters*, 45. <https://doi.org/10.1029/2018GL079865>