



## The Niño1+2 region and the Niño4 region predictability.

Tasambay-Salazar Miguel (2), Ortizbevia Maria Jose (1), Alvarez-Garcia Francisco Jose (1), and Ruizdeelvira Antonio ()

(1) University of Alcalá, Dpto Física y Matemáticas, Alcalá, Spain (mjose.ortiz@uah.es), (2) Escuela Superior Politécnica del Chimborazo, Riobamba, Ecuador

The El Niño-Southern Oscillation variability is monitored basically by the Niño3.4 Index. In addition, the Niño1+2 and the Niño4 Indexes are also used to characterise ENSO variability, by reason of their relationships with some of the variability of the neighboring regions, like the air temperature in South America or Australia. However, with the increased length of the available instrumental ENSO records, the need of considering the two different ENSO types identified, Eastern Pacific (EP) or Central Pacific (CP), has become more evident. (Yu and Kim 2013). While the Niño3.4 Index is used to monitor the EP events, the CP events are currently identified by removing from the Niño4 Index the variability associated to the Niño1+2 Index (Kao and Yu 2009). Therefore there is a renewed interest on the predictability of both Indexes.

In this study we focus on the predictability of the Niño1+2 region variability and those of the Niño4 region, in the recent post-satellital period. We develop a methodology to identify potential predictors among climate modes, represented by their respective indexes. Among the tropical predictors tested we include the most commonly used, like the Southern Oscillation Index or the Warm Water Volume in the equatorial Pacific (WWV) Index, but also some whose part in the ENSO generation and evolution has been pointed only recently, like the Pacific Meridional Mode (PMM) Index or the North Tropical Zonal Gradient and South Tropical Zonal Gradient Indexes. We also include in our study some other tropical Indexes outside the Pacific basin, like the Tropical North Atlantic, the Tropical South Atlantic and the Indian Ocean Dipole Indexes. We use a seasonal approach, based in a linear statistical relationship and focus on leads going from one season to one year.

In the case of the Niño1+2 Index, the number of potential predictors is much higher in spring, followed by winter and summer and last of all autumn. The potential predictor most frequently selected is the WWV Index, tied up with persistence. The other predictors consistently selected are the Pacific Meridional Mode (PMM) Index and the Tropical South Atlantic (TSA) Index. The skill values scored by the Niño4 Index hindcast experiments have many features in common with those found for the Niño3.4 case, as for instance the seasonal dependence on the target month. Here also the WWV is the most frequently selected predictor. The PMM comes in the second place.

### References

- Kao HY, Yu JY (2009) Contrasting Eastern-Pacific and Central Pacific types of ENSO. *J Clim* 22:615-632. doi: 10.1175/2008JCLI.
- Lagos P, Silva Y, Nickl E, Mosquera K (2008) El Niño-related precipitation variability in Peru. *Adv. Geosci.*, 14, 331-337.
- Yu JY, Kim ST (2013) Identifying the types of major El Niño Events since 1870. *Int J Climatol* 33:2105-2112. doi: 10.1002/joc.3575.
- Tasambay-Salazar, M.; Ortiz Beviá, M. J.; Alvarez-García, F. J.; RuizdeElvira Serra, A.. An estimation of ENSO predictability from its seasonal teleconnections. *Theoretical and Applied Climatology*. 2015, doi: 10.1007/s00704-015-1546-3