El Niño, La Niña and Neutral years in terms of tropical modes - A case study

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In the present work we perform a case study, in which, several tropical modes [Madden-Julian Oscillation (MJO), Kelvin, Rossby, Mixed Rossby-Gravity (MRG)] are isolated from Outgoing Long-wave Radiation (OLR) anomaly data for different ENSO conditions (El Niño, La Niña and Neutral year), by mean of the application of Space-Time Spectral Analysis. This separation allow us to study in an independent way each mode in terms of energy, dispersive properties, arrival frequency and intensity, in fact, it was performed over different sectors of South America and the relative dominance of each mode was found for each region. It was evident that the Kelvin wave is the mode that dominates the variability from the synoptic to intraseasonal time-scales over several sectors of South America, being the MJO most prominent only over the SACZ. This result differentiate SA from the rest of the Tropics as a whole, where it is the MJO the dominant mode, excepts in the case of El Niño, where the Kelvin wave appears as the dominant one. This information may be used in the context of tropical predictability for the time scales involved and in particular over South America. It was also shown that some theoretical results concerning non-linear interactions within resonant triads involving Kelvin, Rossby and Mixed Rossby wave are more or less evident in this observational work.