Geophysical Research Abstracts
Vol. 19, EGU2017-15235, 2017
EGU General Assembly 2017

Ocean – atmospheric interactions in South America revealed by two-layer complex climate network analysis

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In recent years, advanced complex network analysis has been successfully applied to deepen our knowledge of the Earth's Climate system, leading to novel approaches for forecasting monsoon onset dates, predicting extreme floods or discriminating between different types of ENSO episodes. In most cases, the correlation structure within a single layer corresponding to a single climate variable (such as temperature or pressure) has been investigated.
In turn, employing complex networks to study the interaction between two or more climate variables could provide a better understanding of the interaction between different variables, regions or specific patterns.
In this work, we focus on South America and investigate the ocean – atmospheric coupling with the help of multilayer complex networks. Specifically, we investigate the influence of different types of ENSO events on the interaction and mutual influence of different climate variables over south America. Our results contribute to a better understanding of correlations between climate variability in parts of the ocean and atmosphere and quantifying the strength of these similarities by means of different network measures.