



## **Forecasting the magnitude and onset of El Niño based on climate network**

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El Niño is probably the most influential climate phenomenon on inter-annual time scales. It affects the global climate system and is associated with natural disasters; it has serious consequences in many aspects of human life. However, the forecasting of the onset and in particular the magnitude of El Niño are still not accurate enough, at least more than half a year ahead. Here, we introduce a new forecasting index based on climate network links representing the similarity of low frequency temporal temperature anomaly variations between different sites in the Niño 3.4 region. We find that significant upward trends in our index forecast the onset of El Niño approximately 1 year ahead, and the highest peak since the end of last El Niño in our index forecasts the magnitude of the following event. We study the forecasting capability of the proposed index on several datasets, including, ERA-Interim, NCEP Reanalysis I, PCMDI-AMIP 1.1.3 and ERSST.v5.