

Scientists reveal roles of wind stress and subsurface cold water in the second-year cooling of the 2017/18 La Niña

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To improve our understanding of the physical mechanisms involved and provide an observational basis for model validation, Dr. Licheng Feng (National Marine Environmental Forecasting Center) and colleagues set out to diagnose the atmospheric and oceanic factors that could have been responsible for the second-year cooling in the 2017/18 La Niña event. They have had their findings published in *Advances of Atmospheric Sciences*.

"ENSO [El Niño-Southern Oscillation] is the major mode of interannual variability in the tropical Pacific climate system," explains Dr. Feng, "and its influences are not limited to regional climate; they can induce worldwide climatic, ecological and societal anomalies. Accurate prediction of ENSO can provide a physical basis for short-term climate prediction. However, real-time prediction of ENSO remains problematic and challenging, with most models failing to predict the Niño3.4 SST cooling when initialized from early-mid 2017. Thus, it is

important to study the factors determining the cooling in 2017, and understand the processes involved."

By using the ERA5 and GODAS (Global Ocean Data Assimilation System) products, atmospheric and oceanic factors were examined that could have been responsible for the second-year cooling, including surface wind and the subsurface thermal state. A time sequence is described to demonstrate how the cold SSTAs were produced in the central-eastern tropical Pacific in late 2017. Both the wind stress anomalies and the subsurface cold anomalies played an important role in the second-year [cooling](#) of the 2017/18 La Niña event.

"Compared with the 2011/12 La Niña event, the 2017/18 La Niña event shows three differences," says Dr. Feng. "First, the effects of the western Pacific warm waters were weak; secondly, the negative SSTAs first emerged in the far-eastern equatorial Pacific in fall 2017; and lastly cold anomalies on both sides of the equator played the same role during the 2017/18 La Niña event. These differences show the diversity of La Niña events," concludes Dr. Feng.

"Future work may be needed to diagnose more reanalysis data to confirm the results," he adds.

More information: Licheng Feng et al, Roles of Wind Stress and Subsurface Cold Water in the Second-Year Cooling of the 2017/18 La Niña Event, *Advances in Atmospheric Sciences* (2020). [DOI: 10.1007/s00376-020-0028-4](https://doi.org/10.1007/s00376-020-0028-4)

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