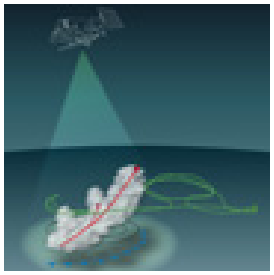

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Observational analysis of atmospheric rivers from dropsondes

Wednesday, 11 March 2020 17:05 (20 minutes)

Atmospheric rivers are a key part of the Californian climate and over the past few years, atmospheric river reconnaissance has been conducted with the aim of improving forecasts as well as understanding the physical processes present. Vertical profiles from over 1000 dropsondes stretching from the upper atmosphere to the ocean surface have been analyzed. Spanning a range of atmospheric conditions and with high vertical resolution, they offer a unique insight into processes within atmospheric rivers and their interaction with the underlying ocean.

We focus on the core of the atmospheric river, where the highest values of integrated vapor transport (IVT) are observed. Using sea surface temperature reanalysis data, we find a positive relationship between ocean-atmosphere temperature difference and low-level atmospheric stability. Where the warm moist air of the atmospheric river core flows over cooler water, a stable layer at the surface is formed. Elsewhere in the atmospheric river where similar ocean temperatures are apparent, the absence of this warm moist air found in the core negates the formation of this stable layer at the surface. We suggest that the ocean's effect on stability under the atmospheric river core is not captured in weather forecast and climate models, with implications for weather system development and downstream impacts.

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