| **Name(s)** | **Project Number** |
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**Project Title**

## Atmospheric Rivers: From Drought to Deluge

**Abstract**

**Objectives/Goals**

Atmospheric Rivers (ARs) are long, narrow plumes of moisture responsible for over 90% of poleward water vapor transport across the mid-latitudes. AR events bring significant precipitation to California and are known to end droughts as well as cause floods. The objectives of this study were: 1) perform a case study of a significant AR event over the Eastern Pacific and U.S. West Coast in February 2014; 2) consider the event in a climatological context of February ARs over a 20-year period.

**Methods/Materials**

Atmospheric River (AR) characteristics (IWV, IVT, 500 & 850 hPa Z, wind) are calculated based on data from NASA MERRA and ECMWF datasets. Data is processed and analyzed using self-written code based on Numerical Python. ARs are isolated in the dataset from the raw IWV & IVT values.

**Results**

The AR is characterized by high levels of IWV (~29 mm) as well as IVT (~759 kgm-1s-1). Analysis of the synoptic-scale progression of upper-level extratropical cyclones and anticyclones shows the flow of vapor transport in a narrow channel ~450 km in width and ~2600 km in length. 20-year composite mean charts for February ARs show peak IVT of 500-600 kgm-1s-1 at the core.

**Conclusions/Discussion**

The February 2014 AR event is one of five significant events in the 20-year period as measured by IWV & IVT relative to the composite mean. The absence of ARs impacting the region in particular years was also explored. This regional characterization provides a better understanding of the formation and frequency of ARs and impacts at landfall#crucial for water resource management, environmental protection, and public safety.

**Summary Statement**

I performed a case study of a significant Atmospheric River event over the Eastern Pacific with in-depth analysis and climatological context.

**Help Received**