

High dimensional IVT Atmospheric River Characteristics Using “CONNected objECT (CONNECT)” segmentation approach: Building a database of Atmospheric Rivers events.

Scott L. Sellars, Center for Western Weather and Water Extremes, Scripps Institution of Oceanography, UC San Diego, 9500 Gilman Drive, La Jolla, CA 92093, USA;
scottsellars@ucsd.edu; 404-234-6046

Brian Kawzenuk, Marty Ralph, Center for Western Weather and Water Extremes, Scripps Institution of Oceanography, La Jolla, CA, USA

Phu Nguyen, The Center for Hydrometeorology and Remote Sensing, University of California, Irvine, Irvine CA, USA

Atmospheric Rivers (ARs), large plumes of moisture often transported from the tropics, impact many aspects of society in the Western U.S. and around the world. ARs are often associated with torrential rains, swollen rivers, flash flooding, and mudslides. Understanding the differences in the physical and environmental characteristics and criteria of ARs is essential in assisting in emergency management preparation, water resource management and flood prediction and planning. The Center for Western Weather and Water Extremes (CW3E) at Scripps Institution of Oceanography has developed an Atmospheric River database to support research and modeling efforts performed by the community. A research database of Integrated Water Vapor Transport (IVT) has been initiated using the object-oriented segmentation approach developed at the University of California Irvine. This segmentation approach is called: “CONNected objECT” or CONNECT (Sellars et al., 2013, 2015) and we apply this approach to NASA MERRA version 2 reanalysis IVT data. This approach derives physical characteristics of “IVT objects” which will be compared to various existing AR catalogs.

In order to characterize the environmental conditions that occurred during the existence of each IVT object, the monthly index values of all of the climate phenomena maintained by NOAA, such as the Arctic Oscillation and Madden Julian Oscillation, were analyzed. These environmental characteristics and physical characteristics of IVT objects such as mean intensity, size, shape, and starting location will be presented. Results from statistical analysis will also be presented, including a description of mean characteristics of a subset of Western U.S. wintertime land falling ARs.