

Atmospheric rivers (ARs), or long, narrow regions of elevated vertically integrated water vapor transport (IVT) and low-level winds, play an important role in hydrometeorological extremes across the Northwest (NW) United States. Here an AR detection algorithm is applied to global reanalysis from the Modern-Era Retrospective Analysis for Research and Applications, version 2 (MERRA-2) to identify and characterize ARs regionally across the continental United States (CONUS). AR detection is based on an objective identification algorithm integrating IVT magnitude thresholding and geometry requirements to account for length, width, and shape orientation. Precipitation extremes are identified based on 3-day precipitation totals exceeding the 95th percentile at each grid point for association with detected AR frequency. ARs over the NW are objectively identified and characterized. Results show that basic geometry, location, and IVT characteristics for ARs over the NW vary across the seasonal cycle. Detected AR length results show positively skewed distributions, where features greater than ~5000km are not uncommon in the region. Additionally, features in the NW demonstrate highly coherent IVT direction, with predominantly westerly flowing AR IVT, and consistent narrowness relative to length. AR precipitation climatology results suggest that a substantial proportion of extreme precipitation days are associated with ARs during the winter and fall in the NW. The seasonality, spatial characteristics, and links to extreme precipitation of ARs in the NW is further compared with other regions of the CONUS to highlight geographic differences in AR climatology. Future applications of this work include evaluating climate model skill at realistically simulating the seasonality and frequency of AR-driven heavy precipitation across the CONUS.