

**ATS/CIRA Colloquium**

**Duane Waliser**  
from UCLA

**Hosted by Sue van den Heever**

**3 p.m. Thursday, April 21**  
**ATS 101 or Microsoft Teams**

## **Water and Aerosol Atmospheric Rivers: Connections to Weather, Air Quality and Climate**

This presentation will highlight the intersections between the science and societal impacts associated with atmospheric rivers (ARs) and the science and applications objectives targeted by NASA's proposed Atmosphere Observing System (AOS) mission [formerly referred to as Aerosol, Clouds, Convection and Precipitation (ACCP)]. The discussion of ARs will include both their traditional form, namely long, narrow filaments of extreme vertically-integrated horizontal water vapor transport, as well as our recent extension of the AR concept applied to aerosol transport extremes, referred to here as aerosol atmospheric rivers (AARs). The former is associated with regional weather and water extremes as well as an important role in helping shape the planet's water and energy distribution and cycles. The latter accounts for major aerosol transport pathways, helps determine the global aerosol distribution, and is associated with regional extreme events of poor air quality. We will highlight the development and application of our global AR and AAR detection algorithms and associated databases to illustrate the widespread global and regional impacts of ARs and AARs on weather, air quality and climate. In addition, it will describe remaining areas of uncertainty related to AR and AAR physical processes and their representations in contemporary global models and reanalysis products. Finally, it will highlight how the airborne and satellite components of NASA's AOS mission might be applied to reduce these uncertainties and lead to improvements in: 1) AR and AAR process understanding, including the underlying interactions between aerosols, clouds, convection, precipitation and the planetary boundary layer (PBL) in helping to establish and modulate these extreme events, and 2) the representations of ARs and AARs in our weather, air quality and climate models.