Atmospheric Rivers Training from UCAR's COMET® Program

Matthew Kelsch, *UCAR's COMET Program, 3085 Center Green Drive, Boulder, CO 80301, United States,* kelsch@ucar.edu*, 303-497-8309*

Atmospheric Rivers (ARs) has been both a highly requested and a challenging training topic for forecasters, educators, and university students. It's highly requested because of its relevancy and impact for many regions of the world. It's challenging because it is an evolving science and therefore training must find a way to stay current with the state of the science.

The COMET Program at the University Corporation for Atmospheric Research (UCAR) has been producing training and educational tools in meteorology, hydrology, climate science, and other natural sciences for more than 25 years. As of 2016 the COMET MetEd website has over 13,000 active registrants, including registrants from more than 1900 universities, 190 nations, and major agencies such as the NOAA National Weather Service (NWS), Meteorological Services of Canada (MSC), the World Meteorological Organization (WMO), and the U.S. Bureau Reclamation.. There are over 800 hours of self-paced, online training. Please access this training at https://www.meted.ucar.edu/. Registration (free) is required.

Training also takes the form of in-residence classes as well as distance-learning, instructor-led classes that have reached thousands of learners.

Training in atmospheric rivers has been delivered using all modes of training.

1. An online lesson, *Satellite Feature Identification: Atmospheric Rivers*, published in March 2012, is an interactive 45-minute lesson that uses rich graphics and interactive drawing tools to teach the science of atmospheric rivers, particularly from a satellite observation perspective. The benefit of this mode of training is that it easily reaches a very large and diverse audience. The limitation is that the material is static and reflects the state of the science in early 2012. Through April 2016, the quiz at the end of the lesson has been completed 583 times. The free online lesson is at https://www.meted.ucar.edu/training_module.php?id=904.

2. Instructor-led classroom presentations on atmospheric rivers have been delivered since 2009, first in NWS-sponsored courses on QPF and Hydrology, and annually since 2010 in the MSC-sponsored Winter Weather Course. Although this mode of training has a smaller audience than the online lesson, it is able to evolve with scientific advances. For example, unlike the online lesson, the classroom activity currently contains information about inland penetration of atmospheric rivers in western North America and studies of moisture traces in North Atlantic ARs.

3. Instructor-led online training was sponsored by the University of Oklahoma School of Meteorology in the form of a mandatory webinar on atmospheric rivers for its hydrometeorology course attendees in February 2015. This lesson used the latest scientific knowledge and employed interactions to foster discussion and learning.

The COMET Program continues to provide training in Atmospheric Rivers and related topics in meteorology and hydrology. Although live presentations are updated with each delivery, self-paced online training needs sponsors to support updates. In this way we can ensure the continued delivery of the latest science and applications to educators, students, forecasters, water resources managers, and others who must plan for the occurrences and impacts of atmospheric rivers.