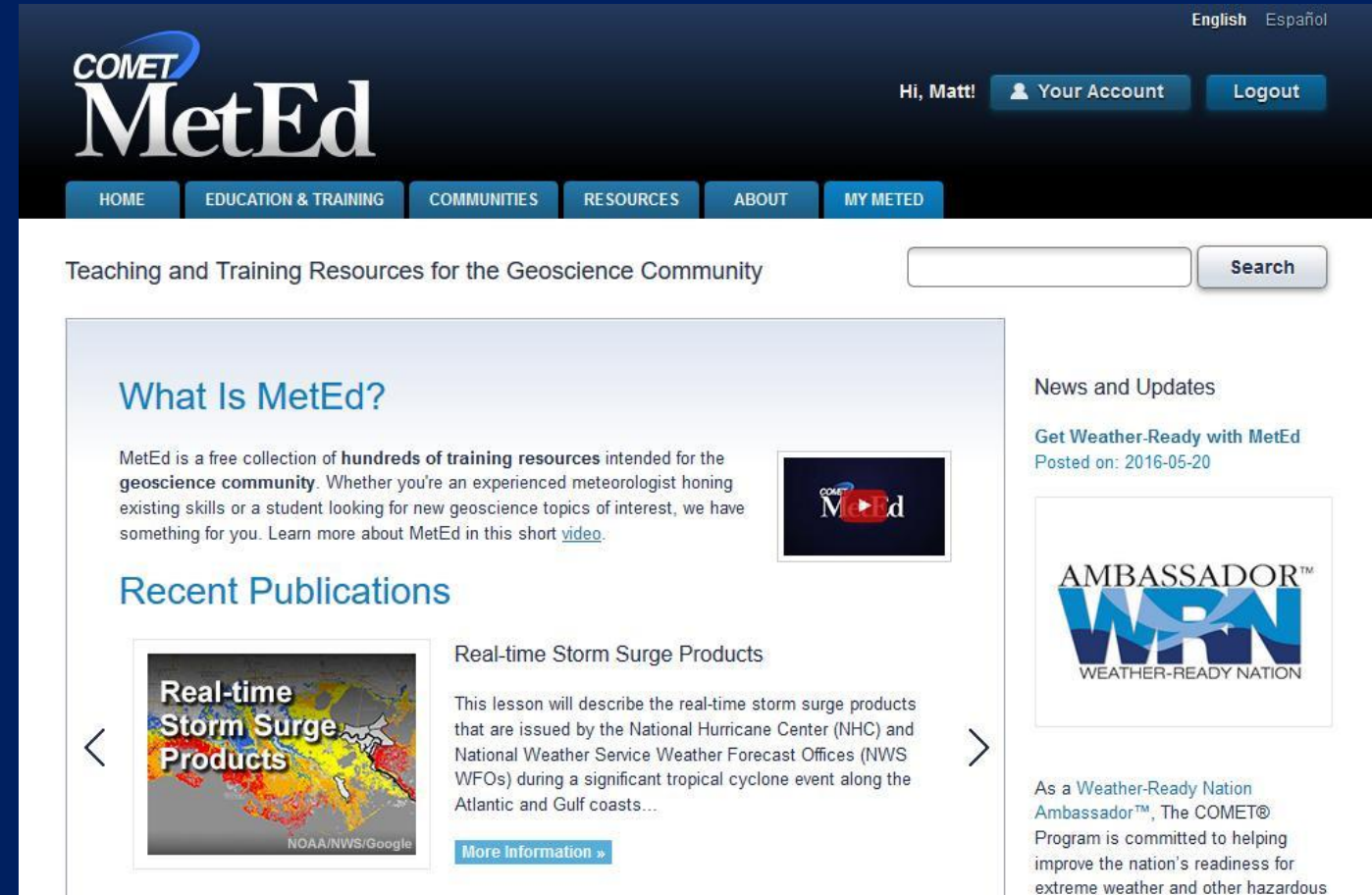




# Atmospheric Rivers Training from UCAR's COMET<sup>®</sup> Program

# What is UCAR's COMET Program?

- Training for professionals, universities, and enthusiasts in natural sciences
  - Over 800 hours of online training
  - Classroom workshops & courses
- International
  - 13,000 registrants
  - 190 nations
  - 1900 universities

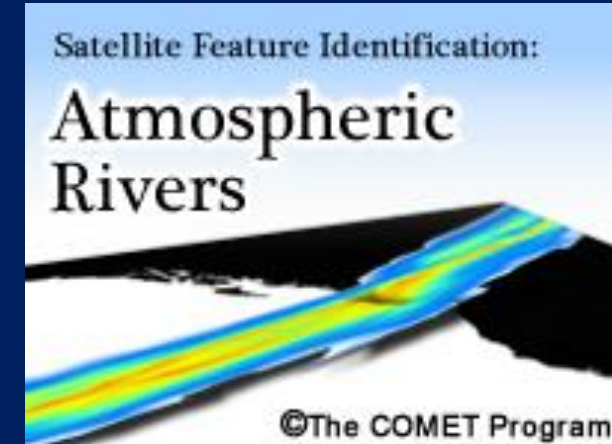


The screenshot shows the homepage of the COMET MetEd website. At the top, there is a navigation bar with the COMET MetEd logo on the left, user information "Hi, Matt!" and "Your Account" on the right, and a "Logout" button. Below the navigation bar are several menu items: HOME, EDUCATION & TRAINING, COMMUNITIES, RESOURCES, ABOUT, and MY METED. The main content area features a search bar and the heading "Teaching and Training Resources for the Geoscience Community". A featured article titled "What Is MetEd?" is displayed, with a sub-heading "Recent Publications" below it. One publication is highlighted: "Real-time Storm Surge Products", which includes a thumbnail image of a storm surge map and a brief description. To the right of the main content, there is a "News and Updates" section with a link to "Get Weather-Ready with MetEd" and a logo for "AMBASSADOR™ WEATHER-READY NATION".



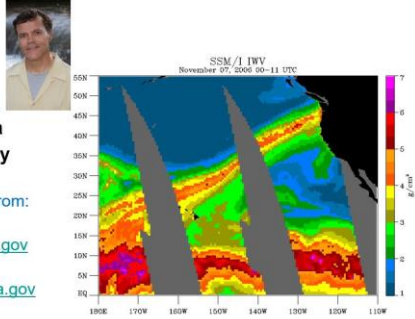
# Modes of Training

- Self-paced, online
  - Example: *Satellite Feature Identification: Atmospheric Rivers*
  - Published March 2013
- Live, online
  - Example: *A Tour of Atmospheric Rivers* (Webinar)
  - Delivered February 2015 to University of Oklahoma hydrometeorology class
- Live, residence classroom
  - Example: Canadian-sponsored *Winter Weather Course*
  - Most recently in January 2016



**A Tour of Atmospheric Rivers**

Matt Kelsch  
UCAR/COMET  
03 February 2015  
[kelsch@ucar.edu](mailto:kelsch@ucar.edu)  
Univ of Oklahoma  
Hydrometeorology

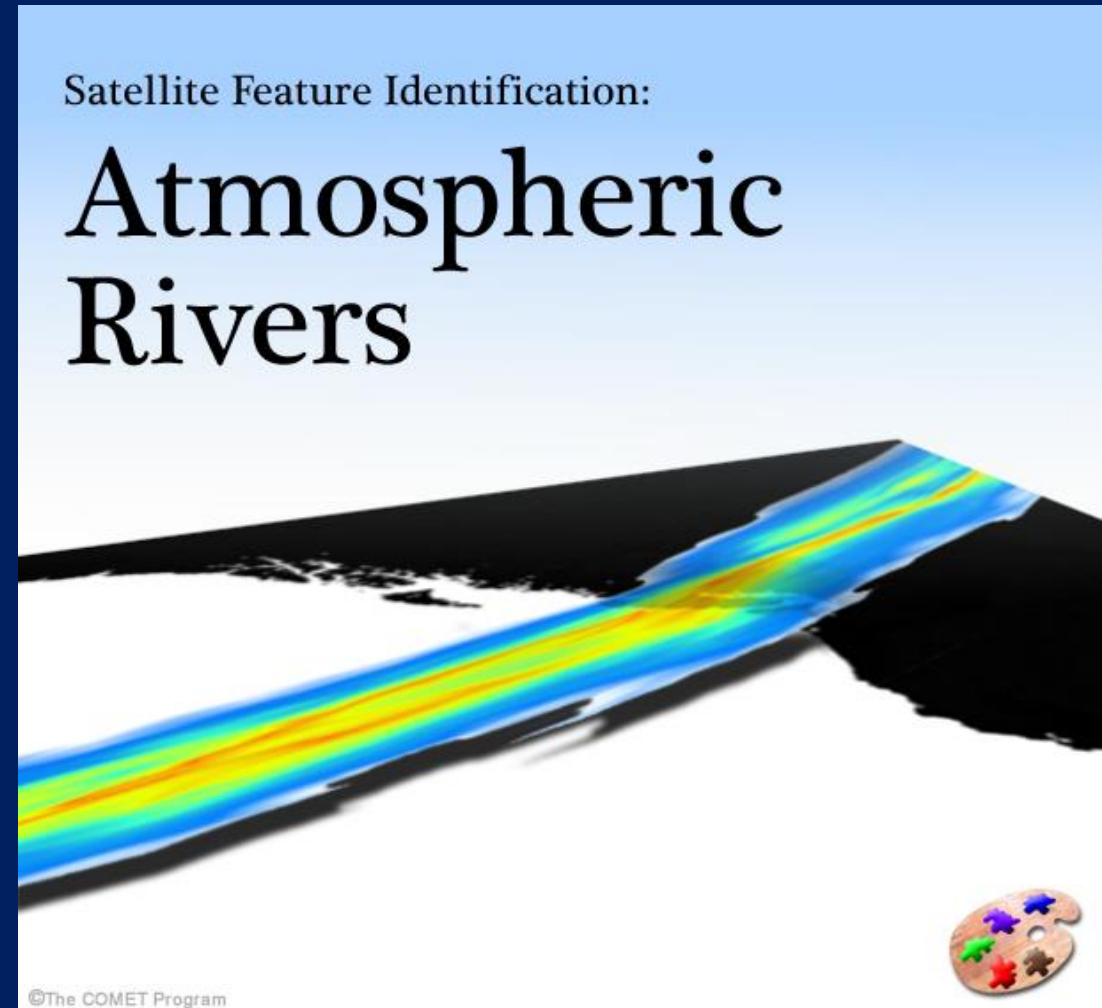


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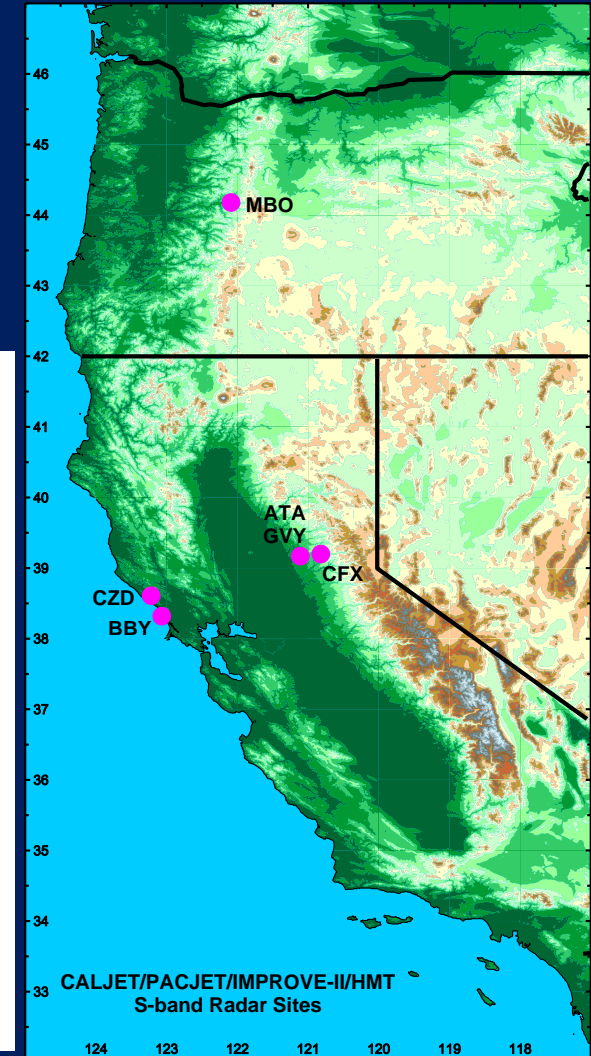
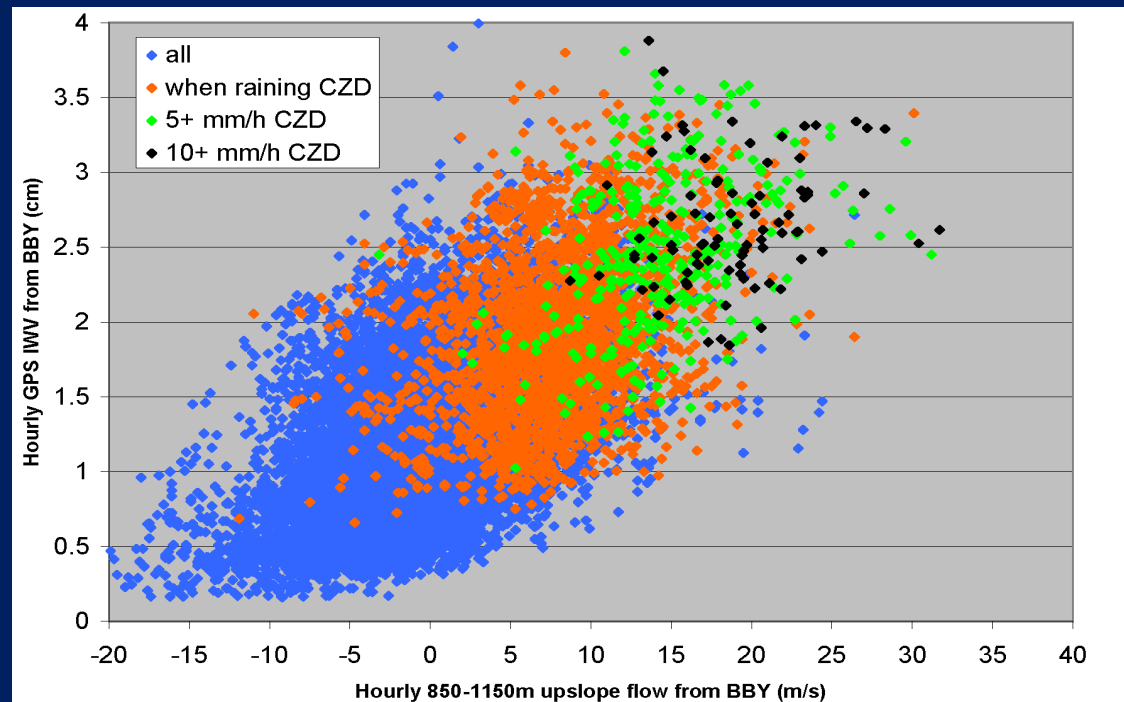
# Online, Self-paced Atmospheric Rivers Lesson

- Published March 2013
- Funded by the Meteorological Services of Canada
- Satellite focus
- Reflected state of the science
- Most work at this point
  - U.S. West Coast
  - Coastal Orography
- Included some non West Coast



# Online, Self-paced Atmospheric Rivers Lesson

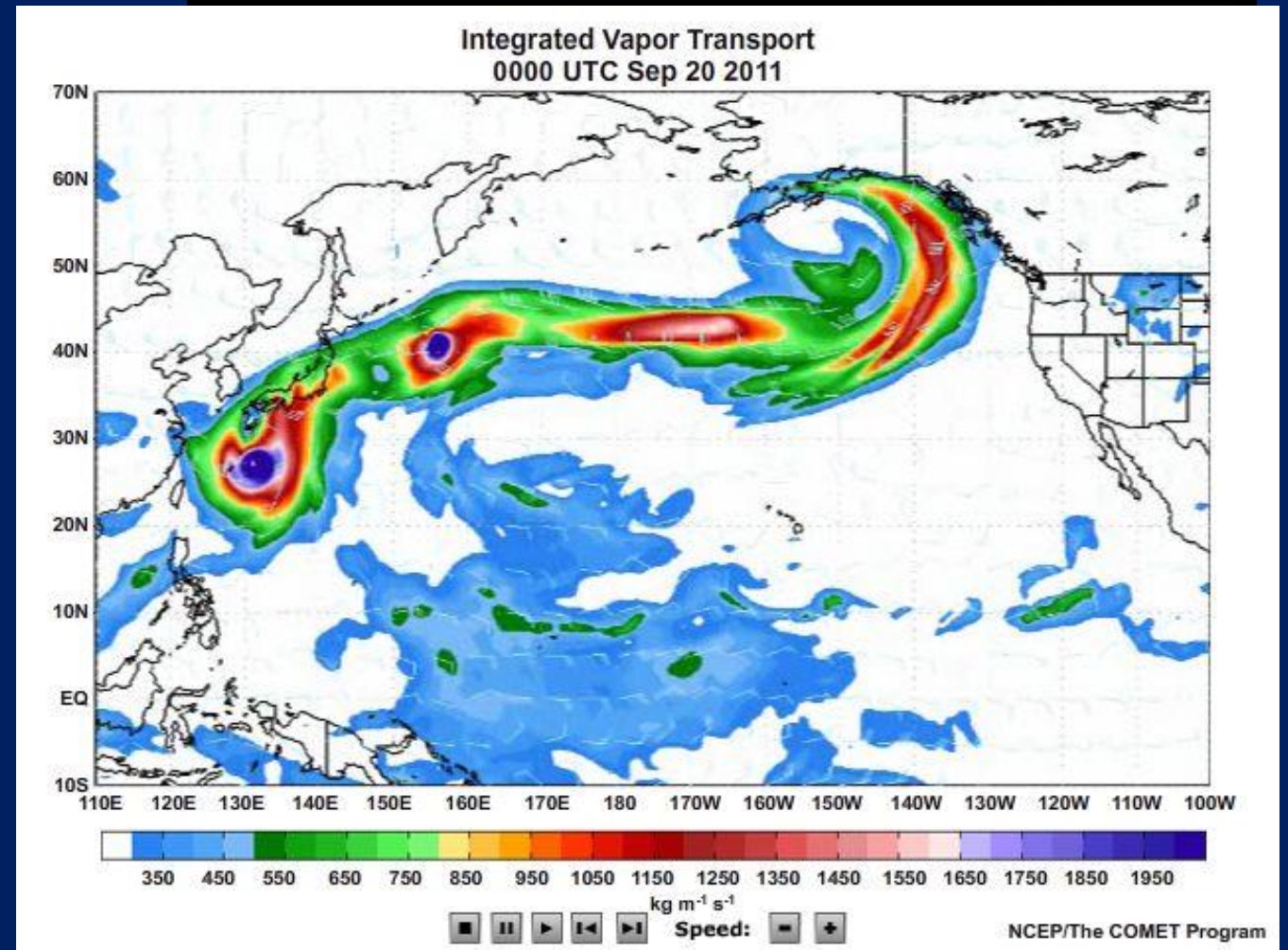
- Reflected studies at the time
- Upslope components
- U.S. West Coast





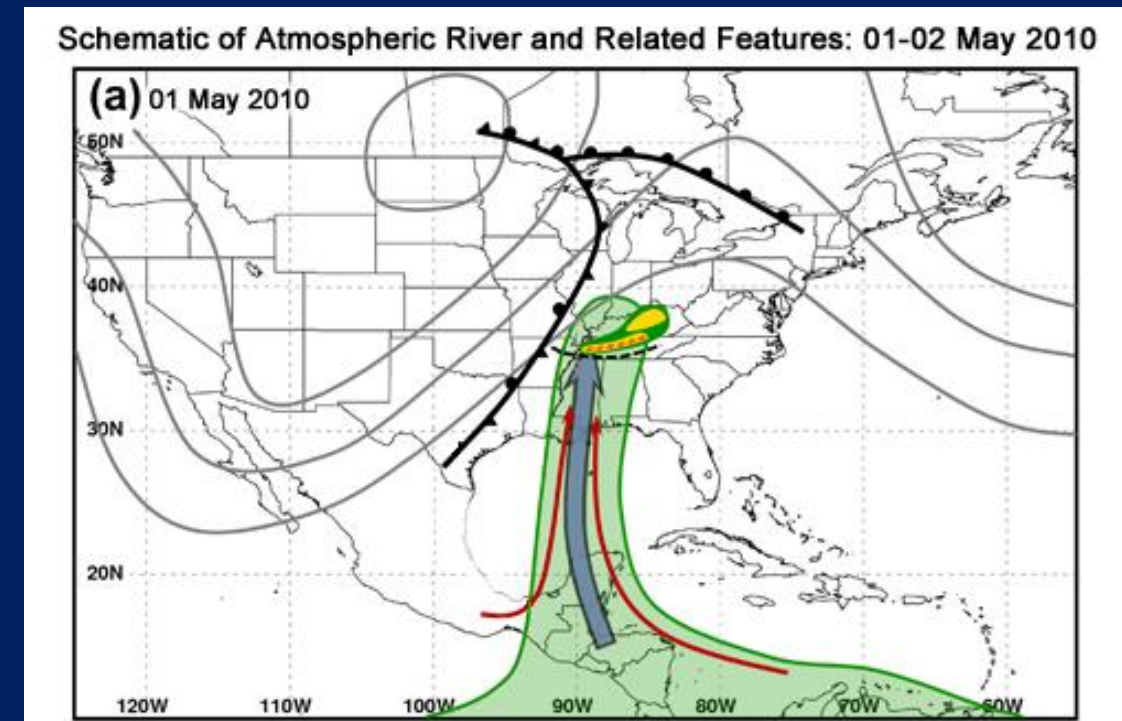
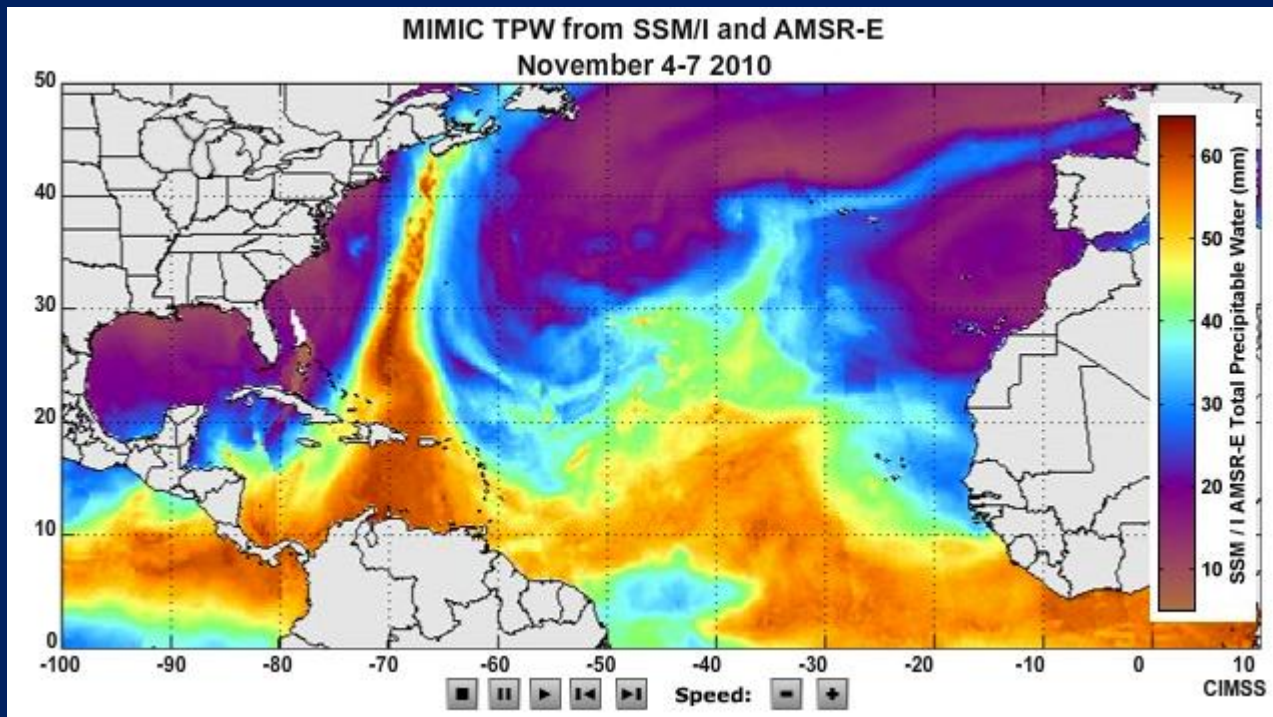
# Online, Self-paced Atmospheric Rivers Lesson

- Interactions
  - Drawing tools using WV, IWV, and IVT
  - Animations
  - Questions



# Online, Self-paced Atmospheric Rivers Lesson

- Cases, not west coast
  - Canadian maritime provinces
  - 2010 Nashville historic rains and flood



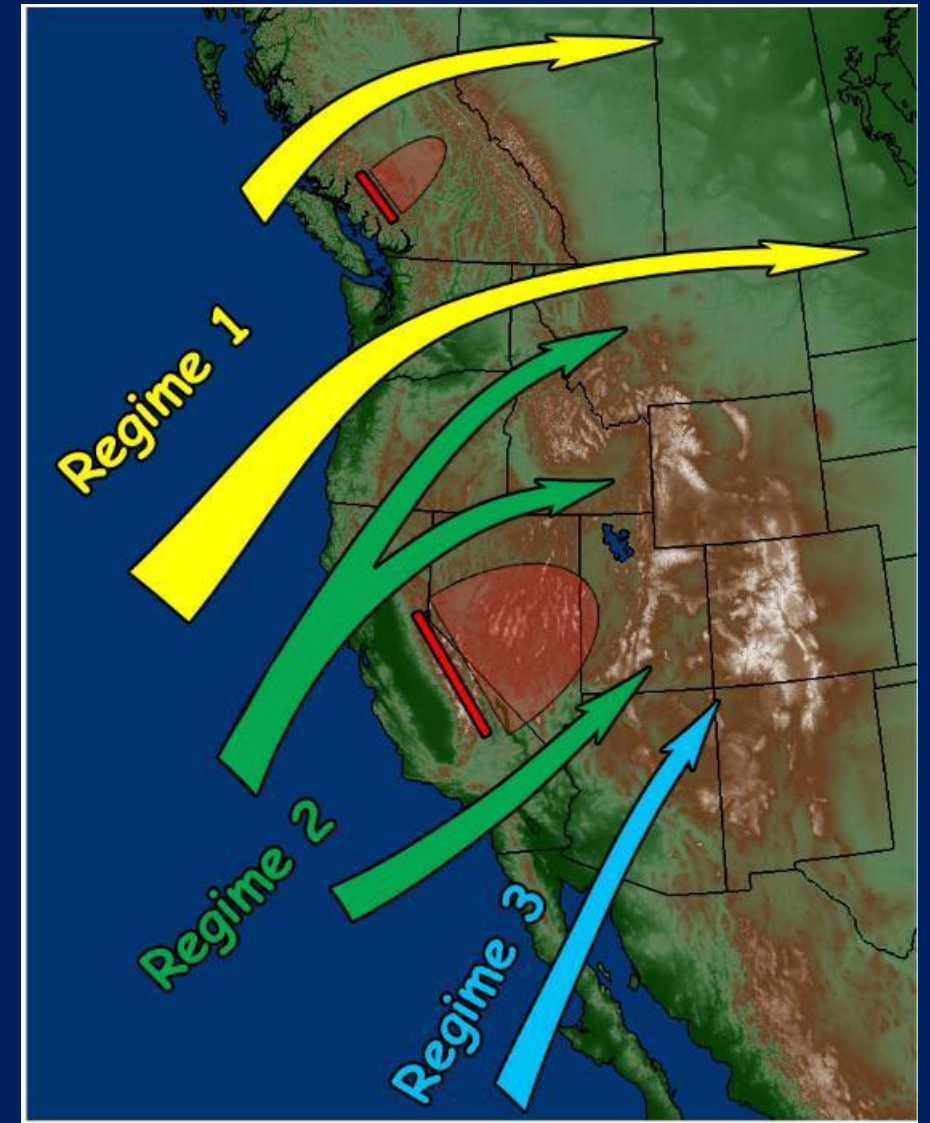
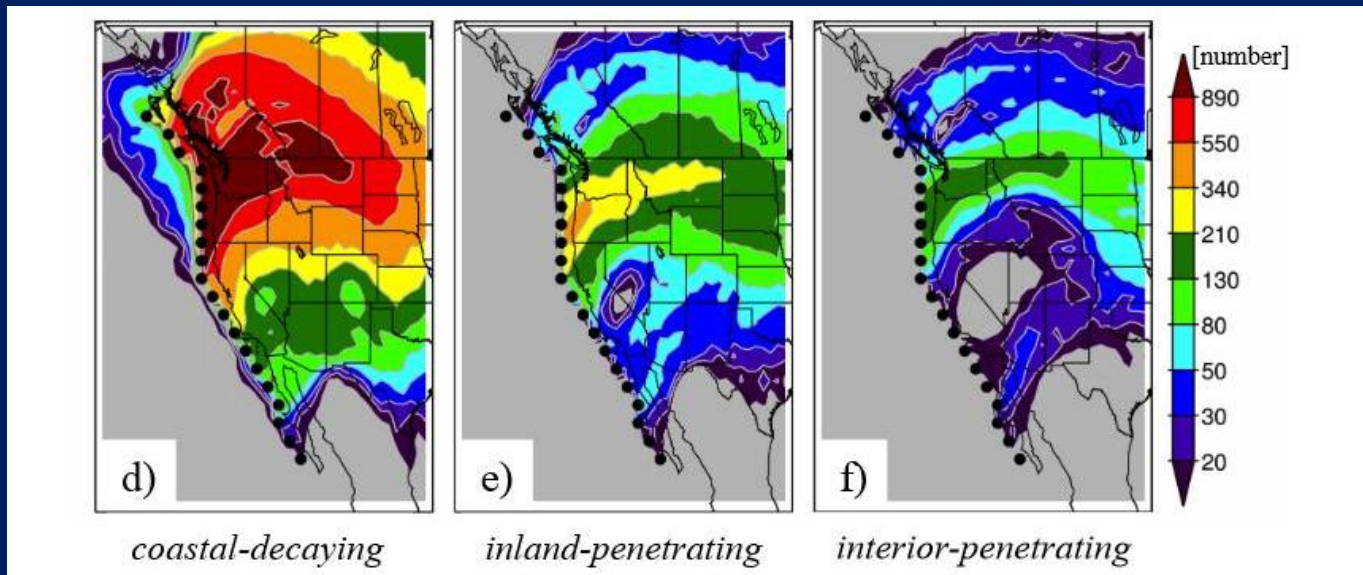
# Live Classroom Presentation

- 2008-2009, QPF courses
- Every year since 2010: Canadian-sponsored Winter Weather Course
  - Students from Canada MSC, U.S. NWS, Europe, and Asia
- Advantages of classroom training
  - More interactions
  - Real time labs
  - **\*\*Training is updated as the science evolves\*\***
- Advantages of online training
  - Much larger potential audience



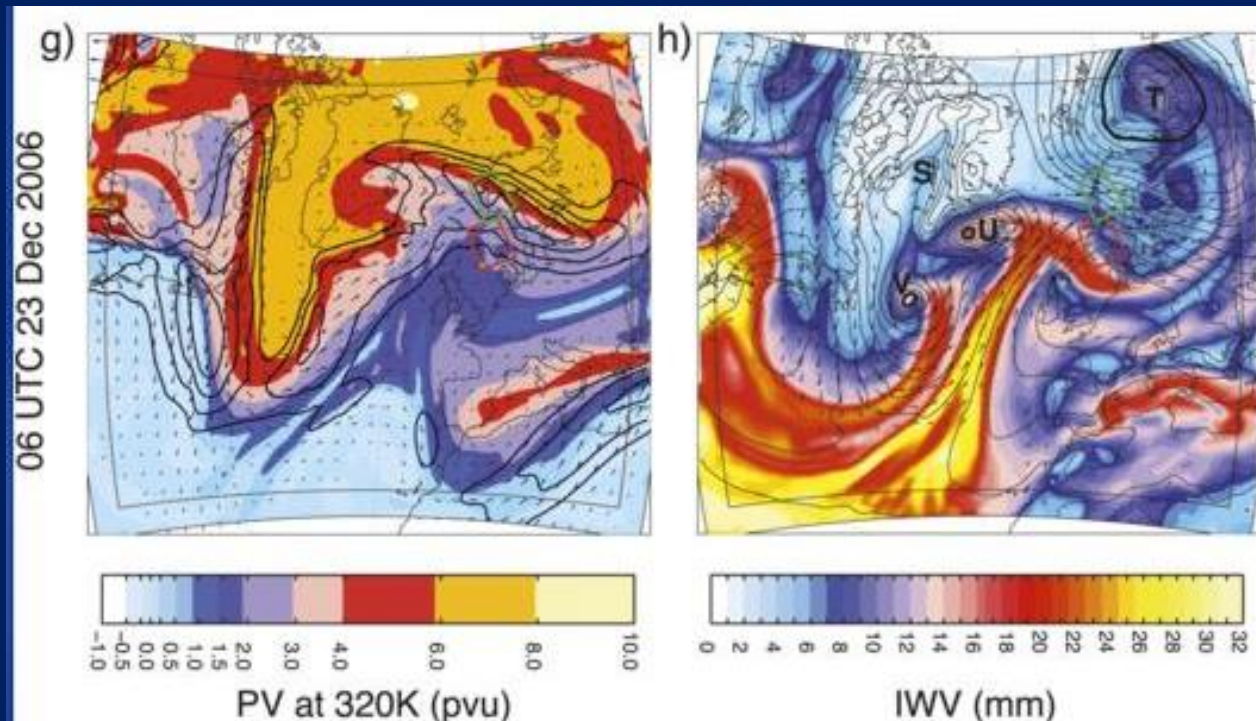
# Live Classroom Presentation

- New concepts compared to online lesson
  - Inland penetration of ARs in the western U.S.
  - Rutz et al 2014



# Live Classroom Presentation

- New concepts compared to online lesson
  - European landfalls
  - Sodemann et al, 2012



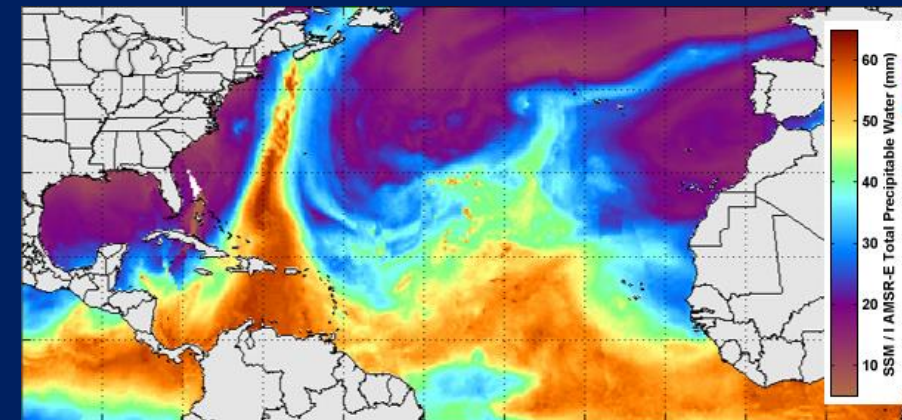
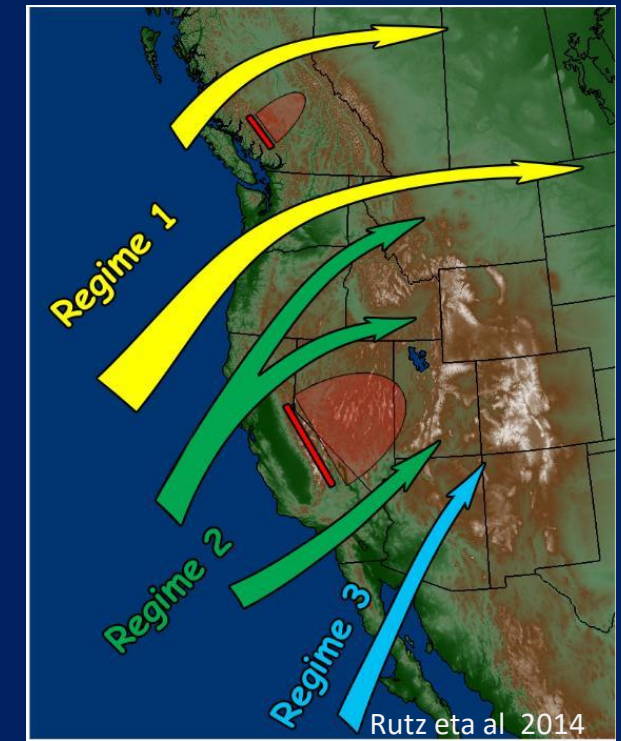
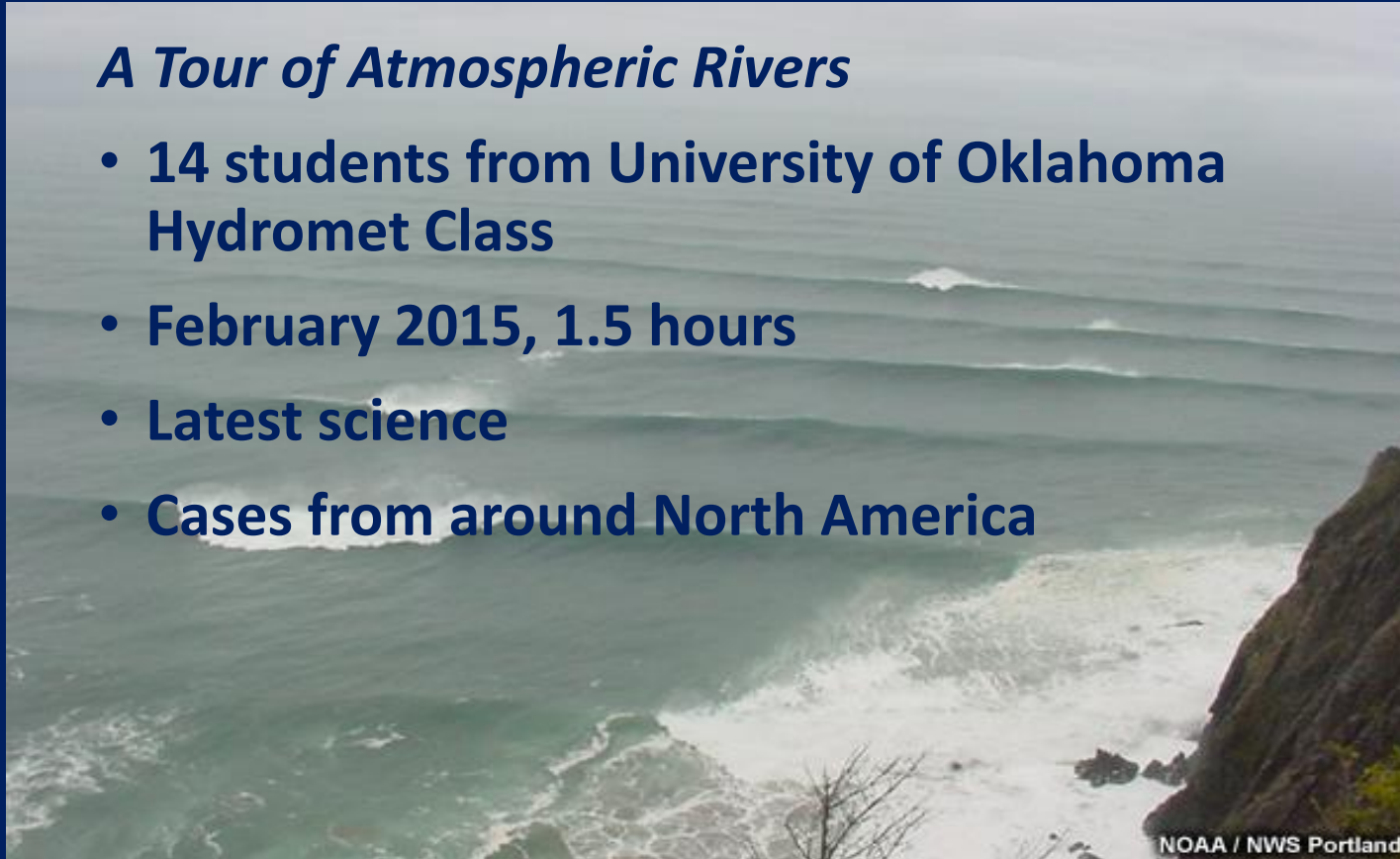
- The relationship of ARs and Warm Conveyor Belts
- Tracing moisture from the tropics



# Live, Online Webinar

## *A Tour of Atmospheric Rivers*

- 14 students from University of Oklahoma Hydromet Class
- February 2015, 1.5 hours
- Latest science
- Cases from around North America





# Atmospheric Rivers Training from UCAR's COMET® Program

- Training takes place in different ways (online, classroom)
- Online training needs support for revision and updates
- Online training reaches more learners

## Atmospheric Rivers Bibliography

### Journal articles on atmospheric river related topics

Criteria for inclusion: the term “Atmospheric river” is used in the abstract or text, or the study focuses on horizontal water vapor transport closely related to atmospheric rivers, but different jargon is used.

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## Atmospheric Rivers Bibliography

### Journal articles on atmospheric river related topics (continued)

Criteria for inclusion: the term “Atmospheric river” is used in the abstract or text, or the study focuses on horizontal water vapor transport closely related to atmospheric rivers, but different jargon is used.

- Neiman, P.J., E.M. Sukovich, F.M. Ralph, and M. Hughes, 2010: A seven-year wind profiler-based climatology of the windward barrier jet along California’s northern Sierra Nevada. *Mon. Wea. Rev.*, **138**, 1206-1233.
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