

COMET: Improving Service to Society through Education and Training

Dr. Greg Byrd, Deputy Director

Matt Kelsch, Hydrometeorologist



20 October 2016



What can we do to be better prepared?

13

WTHR **com**

INDIANA'S NEWS LEADER

HOME
NEWS
WEATHER
TRAFFIC
SPORTS

Five dead, dozens injured in State Fair stage collapse

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Posted: Aug 13, 2011 7:10 PM MDT
Updated: Sep 15, 2014 11:28 AM MDT

INDIANAPOLIS - Five people were killed and at least 40 more injured when a stage collapsed at a concert at the Indiana State Fair Saturday night.

Note: This is WTHR.com's original story on the tragedy. For a more recent story and updates, [click here](#).

The stage was set up for a concert by the country music band Sugarland at the state fairgrounds. Rigging for the stage lighting reportedly fell around 8:50 p.m., before the main act took the stage.

Indiana State Police 1st Sgt. Dave Bursten said two of the deceased victims have been identified. Police are working with the coroner's office to make identifications and notify families of the victims.

Bursten said at least 40 people were injured and transported to area hospitals, but that number did not include those who transported themselves to the hospital. He said the degree of injuries ranged from "cuts and scrapes to very serious injuries."

"There is a possibility that we could have other deaths," Bursten said. "We hope that everybody will be praying for those injured people."

Police are also concerned about victims that may have become





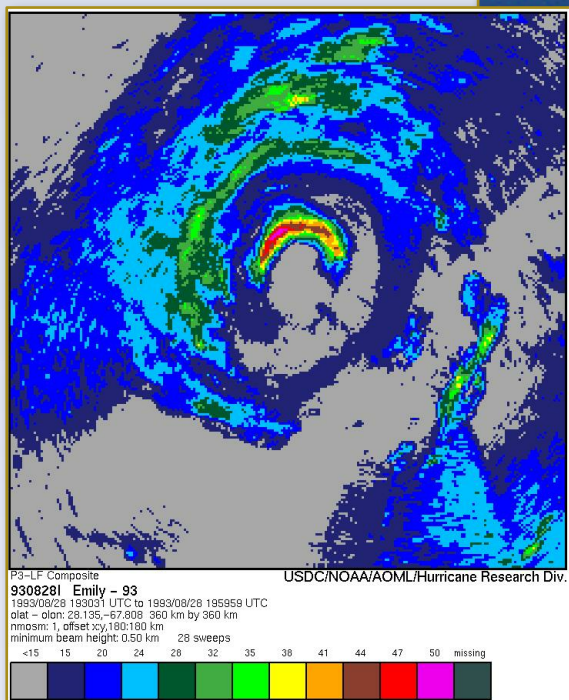


Lesson from Flight 1549



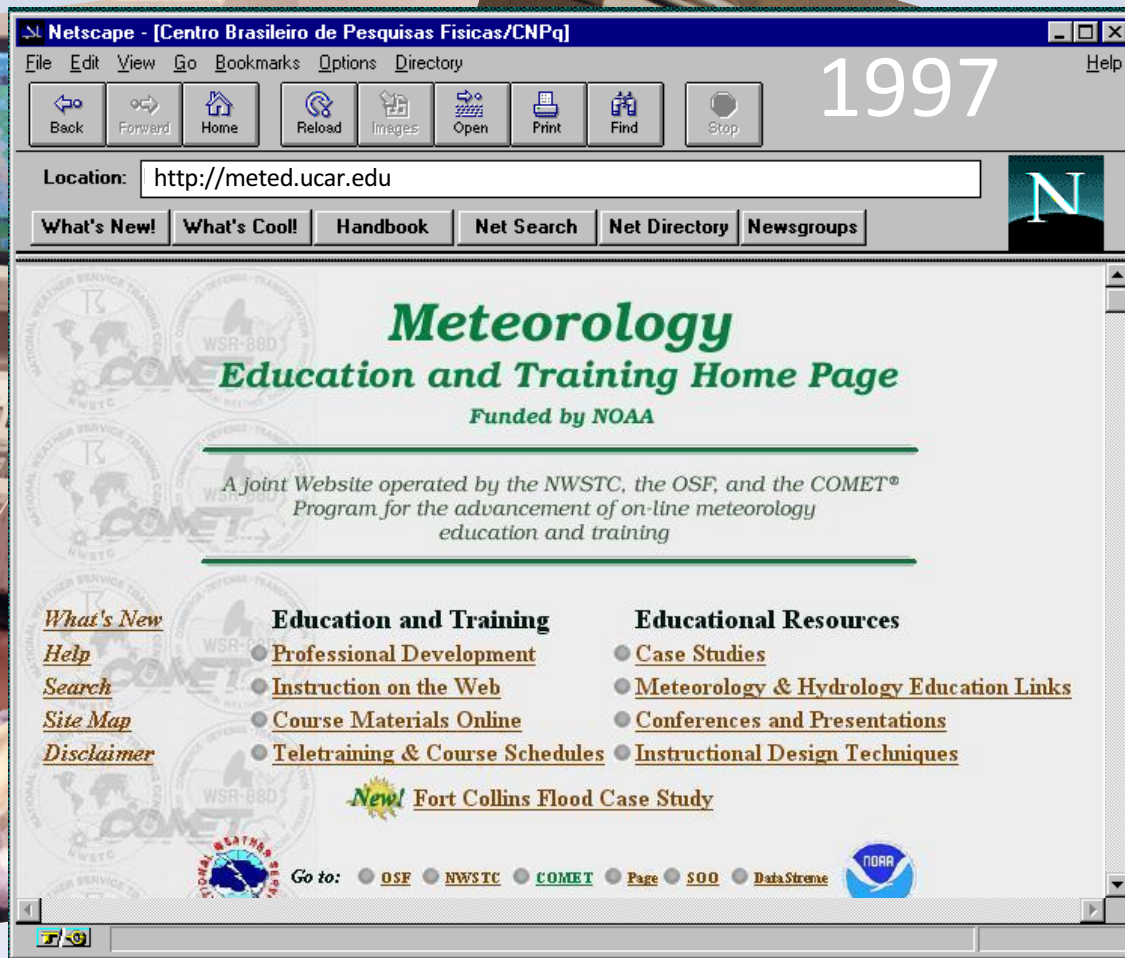
Training is about getting people ready to execute and put their training to the test when the organization needs it the most.

The COMET Program



Created in 1990 to support NOAA NWS Modernization (Doppler radar deployment, etc.)

25 Years of World-Class Education and Training



Awards!



2004 Louis J. Battan Authors Award, K-12 Category for Hurricane Strike!™



For Polar Lows Ungava Bay Case Study



Finalist Recognition International Science & Engineering Visualization Challenge 2009

Recognized with the 2010 Chief Learning Officer Learning in Practice Certificate of Merit for "Excellence in Content"



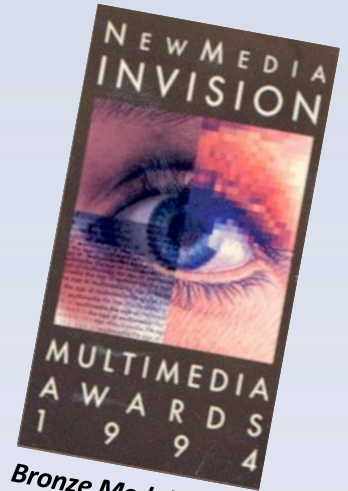
2000 Hurricane Conference Outstanding Achievement Award for Community Hurricane Preparedness



American Geophysical Union Excellence in Geophysical Education Award 2006



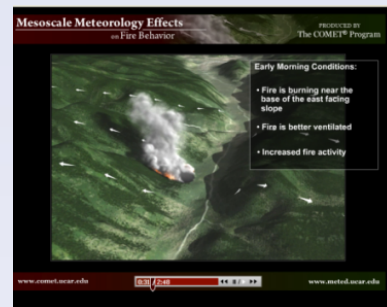
2009 National Weather Association Public Education Award



Bronze Medal for Boundary Detection & Convection Initiation



2005 Honorable Mention in the non-interactive media category of the Science & Engineering Visualization Challenge



2008 NSF and the Journal Science International Science & Engineering Visualization Challenge: Semi-Finalist

Program Details

Primary Sponsors: NOAA NESDIS, NOAA NWS, NOAA NOS, MSC Canada, Bureau of Reclamation, US Navy NMOC, EUMETSAT, BoM Australia, USACE

Staff of 25: (plus 16 surge)

- Subject matter experts (meteorologists, hydrologists, engineers, etc.)
- Instructional designers
- Web and application developers
- Graphic artists
- Spanish translator/coordinator
- IT staff
- Administrative support staff



Dr. Richard Jeffries
Director and Principal Investigator



MetEd Website Now

The screenshot shows the MetEd website homepage. The header includes the COMET MetEd logo, navigation links (HOME, EDUCATION & TRAINING, COMMUNITIES, RESOURCES, ABOUT, MY METED), and user options (Sign Up, Have an account?, Sign In). The main content area features a search bar, a 'What Is MetEd?' section with a video thumbnail, 'Recent Publications' with a featured article 'Principles of Celestial Navigation', and a 'Find What's Right for You' section with a search tool. A 'News and Updates' section highlights the 'GOES-R Satellites Orientation Course'.

www.meted.ucar.edu

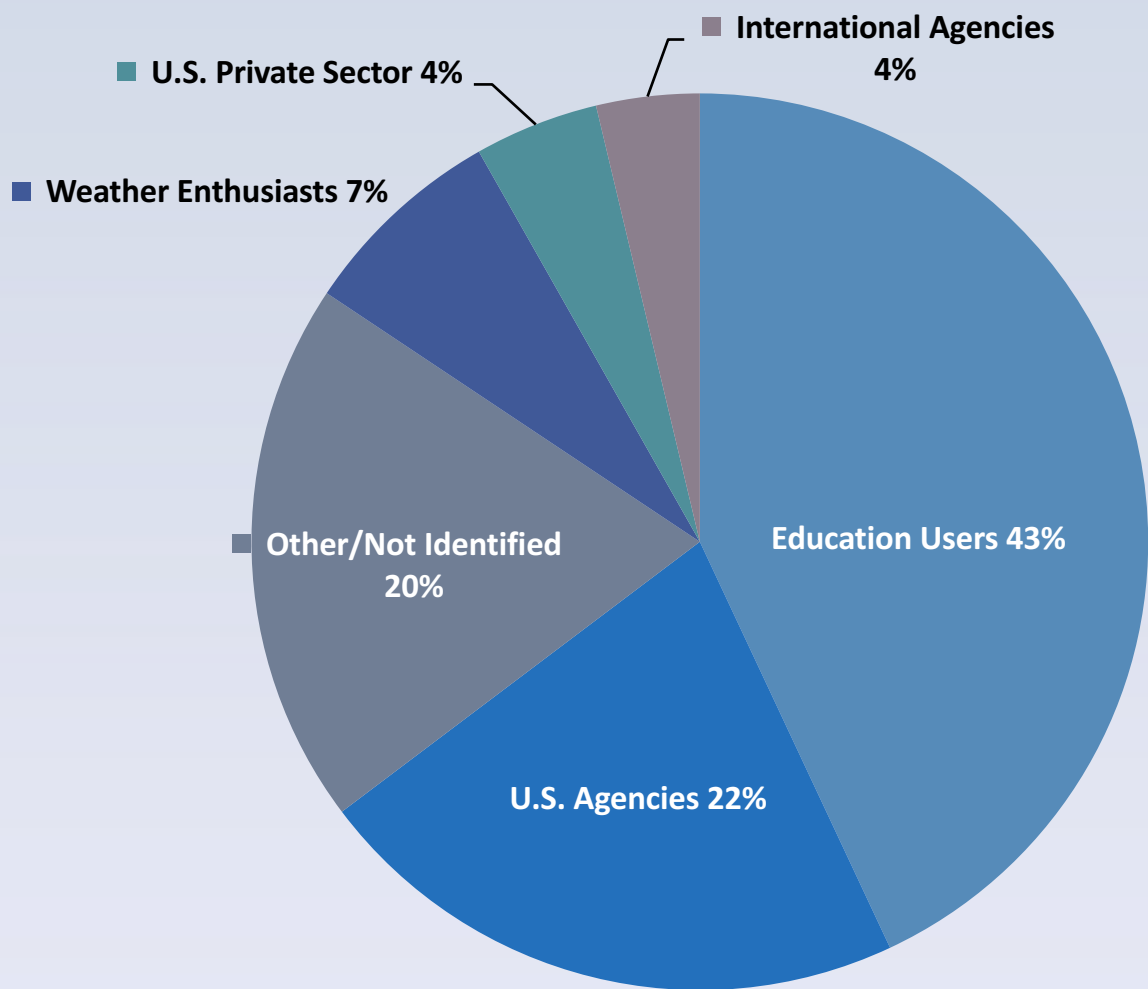
Online Lessons:

- 380 English, 135 Spanish, 61 French
- 800+ hours of self-directed distance learning material

Registered Users:

- 450,000 and growing ~5,000 per month
- ~150,000 international, representing most national met services
- ~150,000 students representing 1,500+ universities
- 52,000 return users each year complete approx. 3 hours of instruction annually

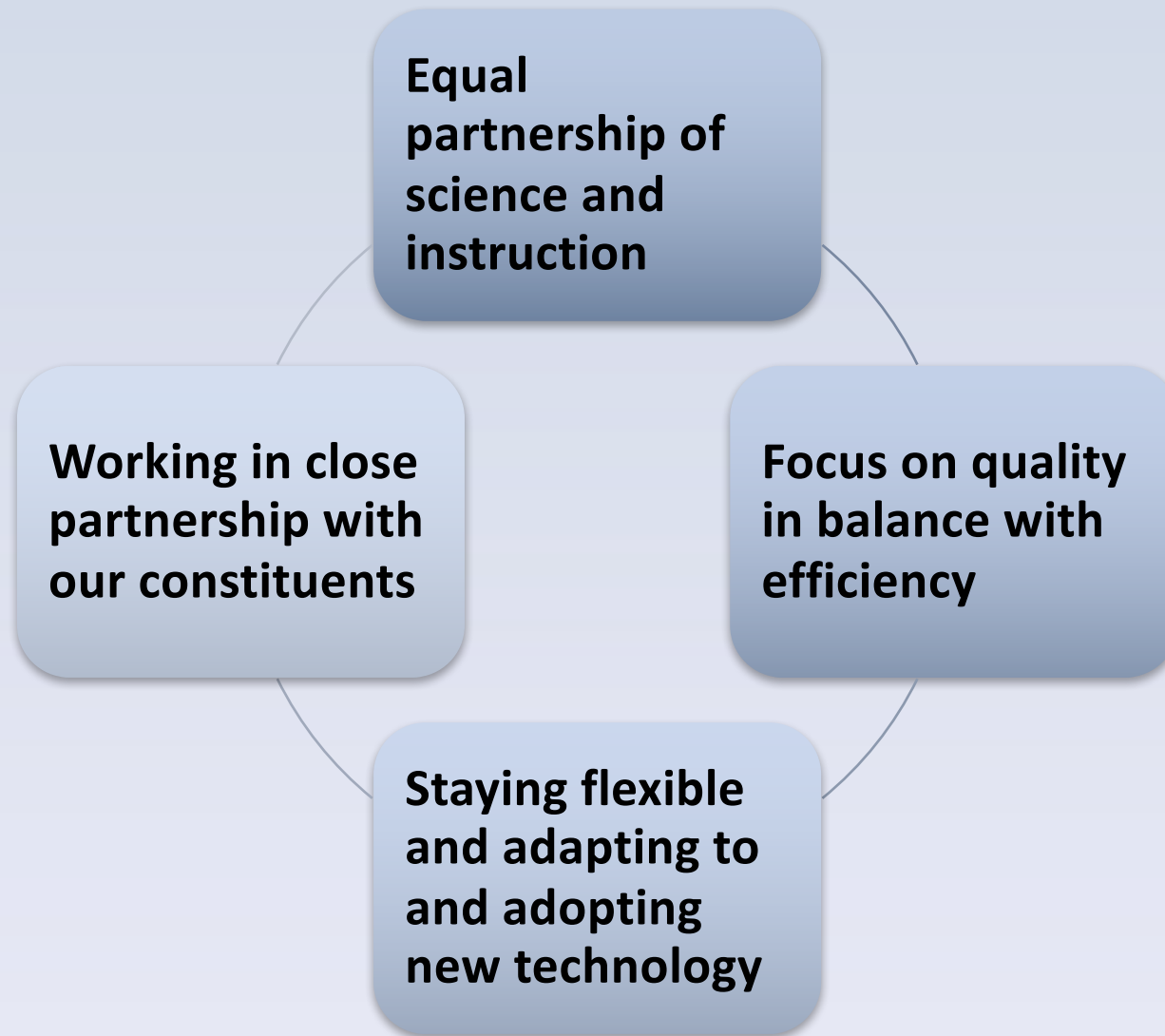
Registered MetEd Users

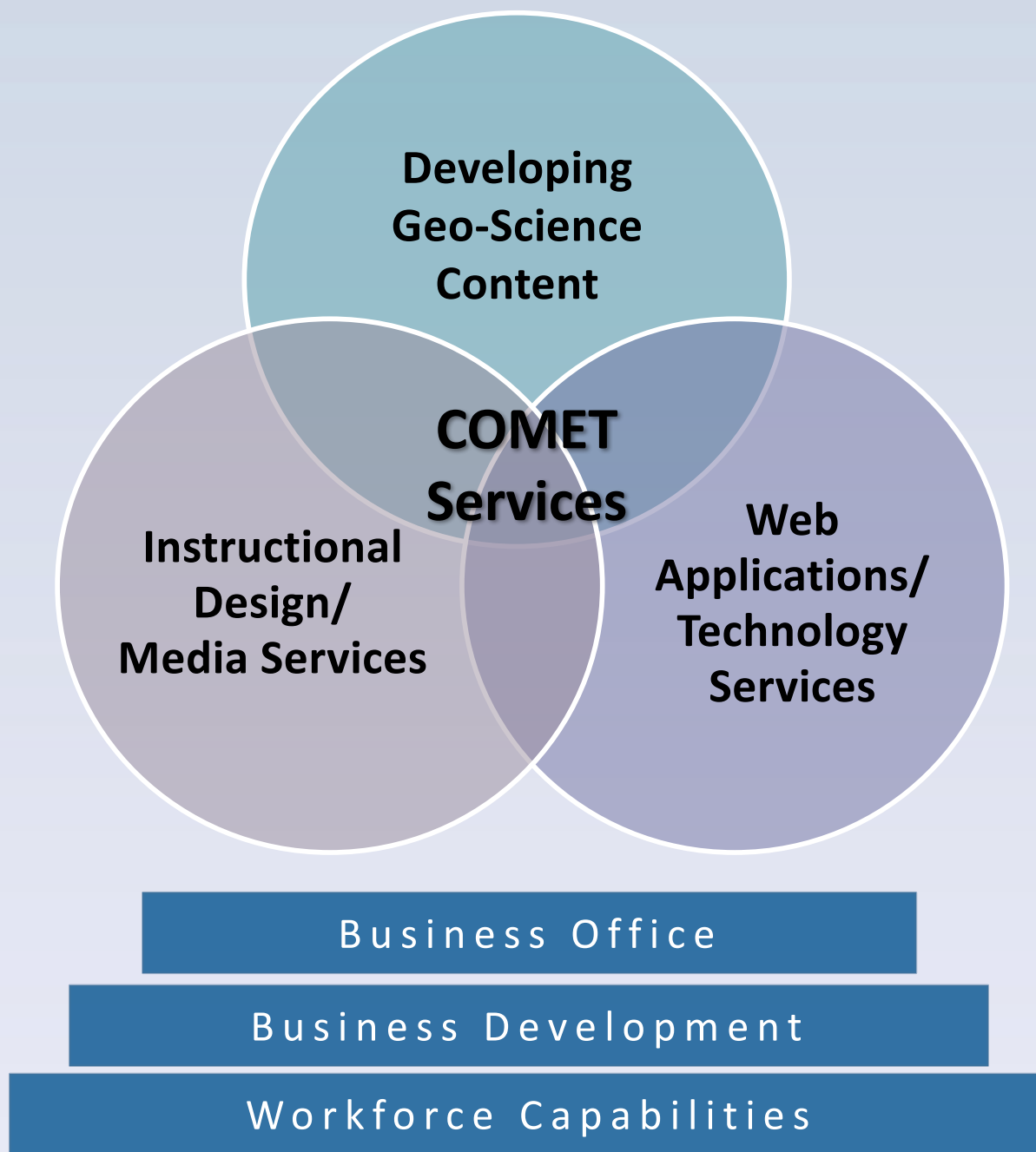


450,000+ registered users

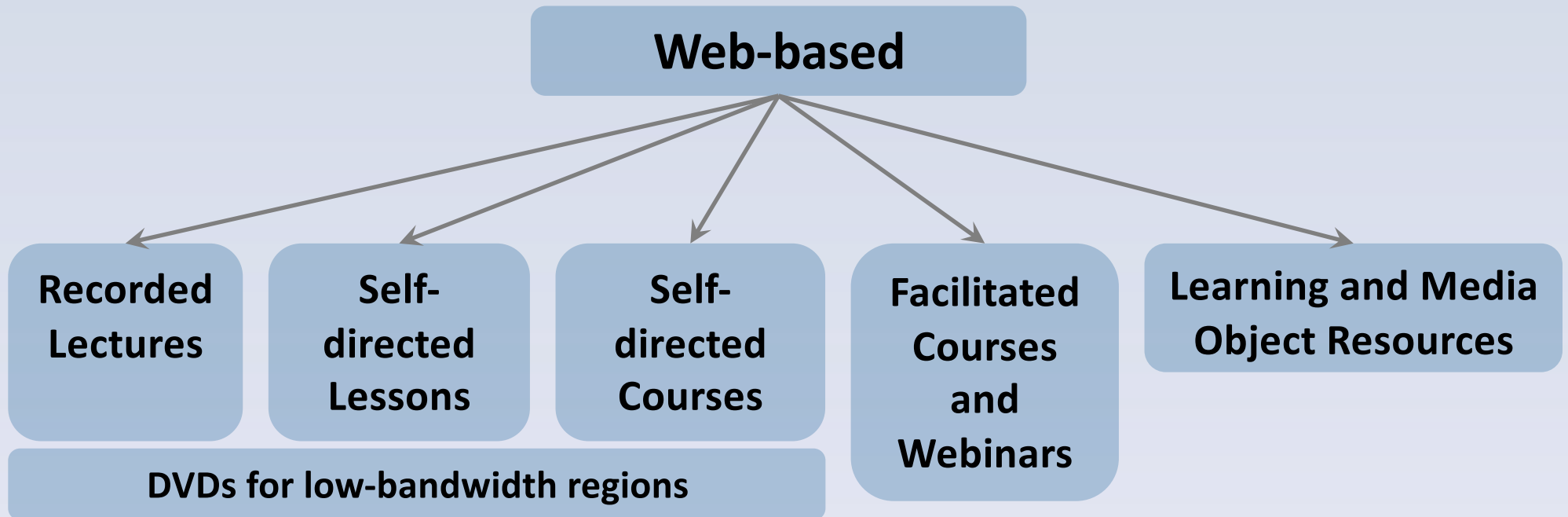
- Education Users
- U.S. Agencies
- Other/Not Identified
- Weather Enthusiasts
- U.S. Private Sector
- International Agencies

Long-term Success





COMET Niche is Distance Learning



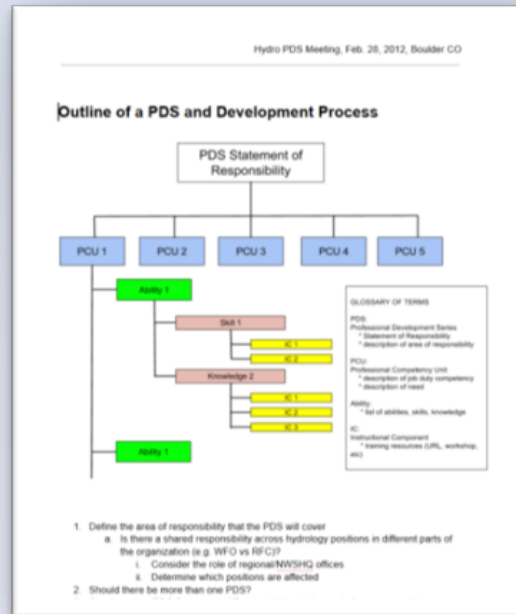
COMET Services

Facilitating Virtual and Residence Courses:

- 10 weeks of virtual and residence courses/year
- Virtual courses (e.g. climate variability, hydrologic impacts under climate change)
- Residence courses (e.g. winter, mountain weather)
- Facilitated meetings and workshops

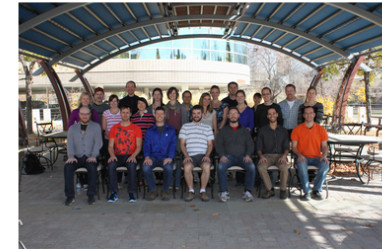
Instructional and Media Design:

- Needs and gap analysis
- Video, scripting and production
- Media development (i.e. database with 40K elements)



MSC/COMET Winter Weather Course 2014

Thanks for a great course! We learned a lot, made great connections, and built lasting bonds. It was great to have you all in Boulder.



-- The MSC/COMET Winter Weather Course Team

News forum

Instructor Resources

Presentation Dropbox

Capacity Development: Weather Ready Nations

Impact-based Decision Support Services

- New International Capacity Development Effort
- Better understanding of societal impacts
- Making our information more relevant to decision makers
- Participating directly in decision making for those decisions fundamental to the role of government, especially the protection of life and property
- Severe Wx Outbreaks (May/Nov. 2013 & April 2014)
 - Effective use of webinars and social media
 - Supporting recovery efforts with continued severe weather threats



“The information you and the weather service provided us ultimately saved more lives than we could ever count.”

--Shane Cohea, Moore Medical Center

CoCoRaHS Role in Science Training

Matt Kelsch

- CoCoRaHS coordinator and observer
- NWS cooperative climate observer
- Recording daily weather since age 10



Photo by Bob Henson

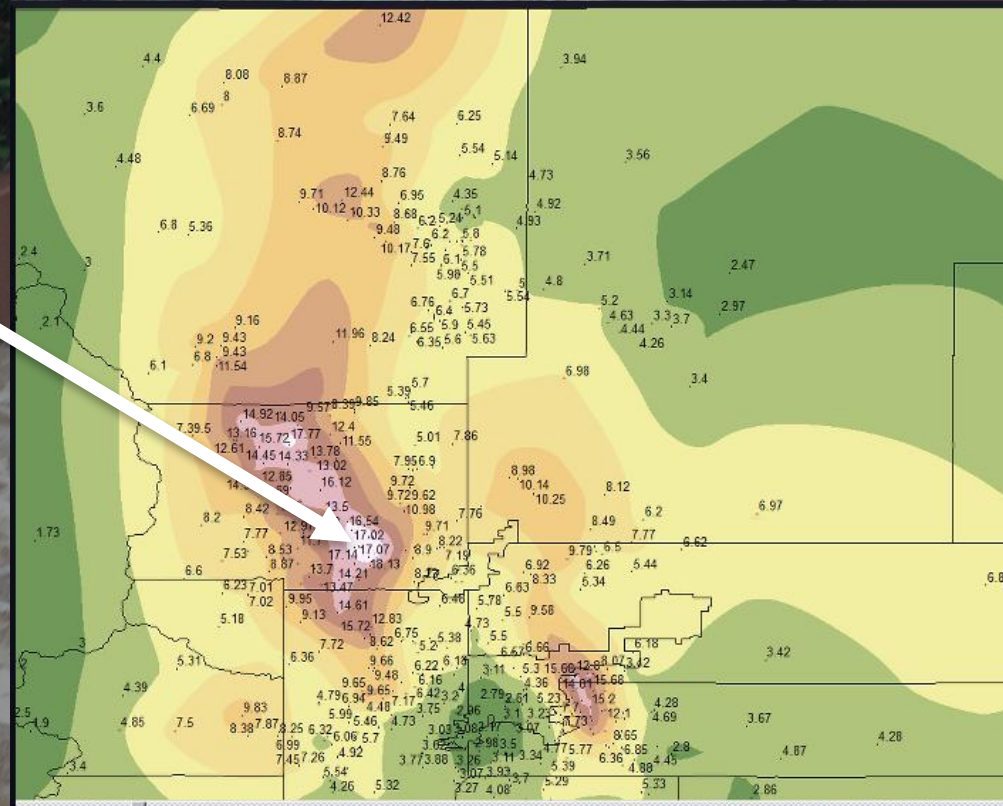
December 20, 2006
Photo by Matt Kelsch

CoCoRaHS Role in Science Training



September 12, 2013
Boulder, Colorado
Photo by Bob Henson

CoCoRaHS Role in Science Training



Rain Gauge Training

Rain Gauges: Are They Really Ground Truth?

Rain Gauges:
Are They Really Ground Truth?
A Webcast by Nolan Doesken and The COMET® Program



Languages: English
Publish Date: 2001-02-05

Skill Level: **2**
Completion Time: .50 - .75 h
Includes Audio: yes
Required Plugins: Flash
Topics:
Hydrology/Flooding, QPF/QPE
(Precip)

BEGIN LESSON

Add to Queue

Take the quiz?

Begin Quiz

Recorded 2001 presentation
by Nolan Doesken

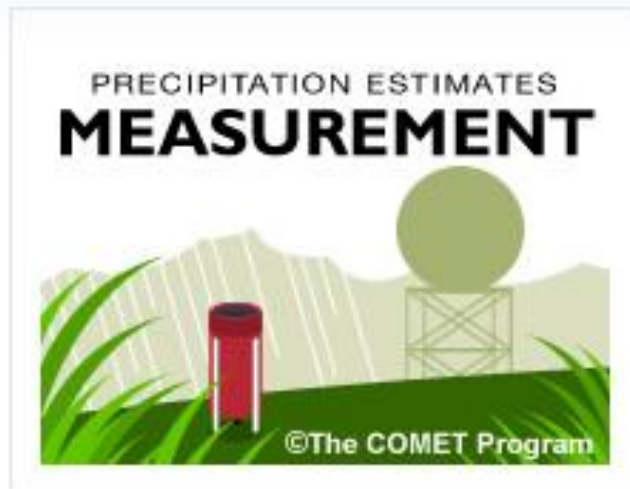


https://www.meted.ucar.edu/training_module.php?id=51

Precipitation Measurement, including Rain Gauges

- 2009 lesson
- https://www.meted.ucar.edu/training_module.php?id=526

Precipitation Estimates, Part 1: Measurement



Languages: English, Spanish
Publish Date: 2009-06-03
Last Updated On: 2016-08-30

Skill Level: 1
Completion Time: 1.25 - 1.50 h
Includes Audio: yes
Required Plugins: none
Topics:

Hydrology/Flooding, QPF/QPE
(Precip), Radar Meteorology
Included in Courses:
Understanding the Hydrologic
Environment

BEGIN LESSON

Add to Queue Your Queue»

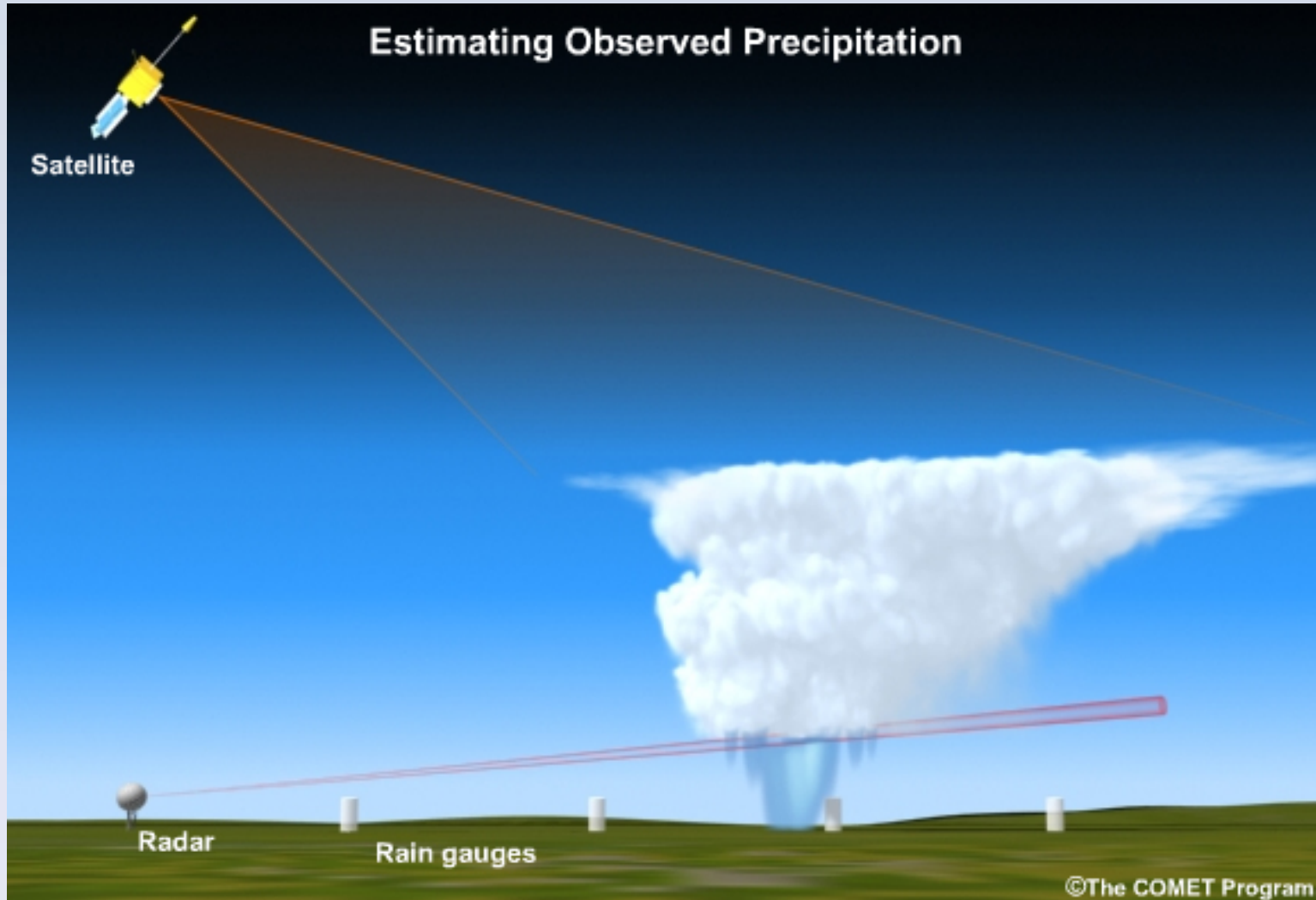
Take the quiz?

Begin Quiz

Share this resource:



Rain Gauges are an Important Contributor

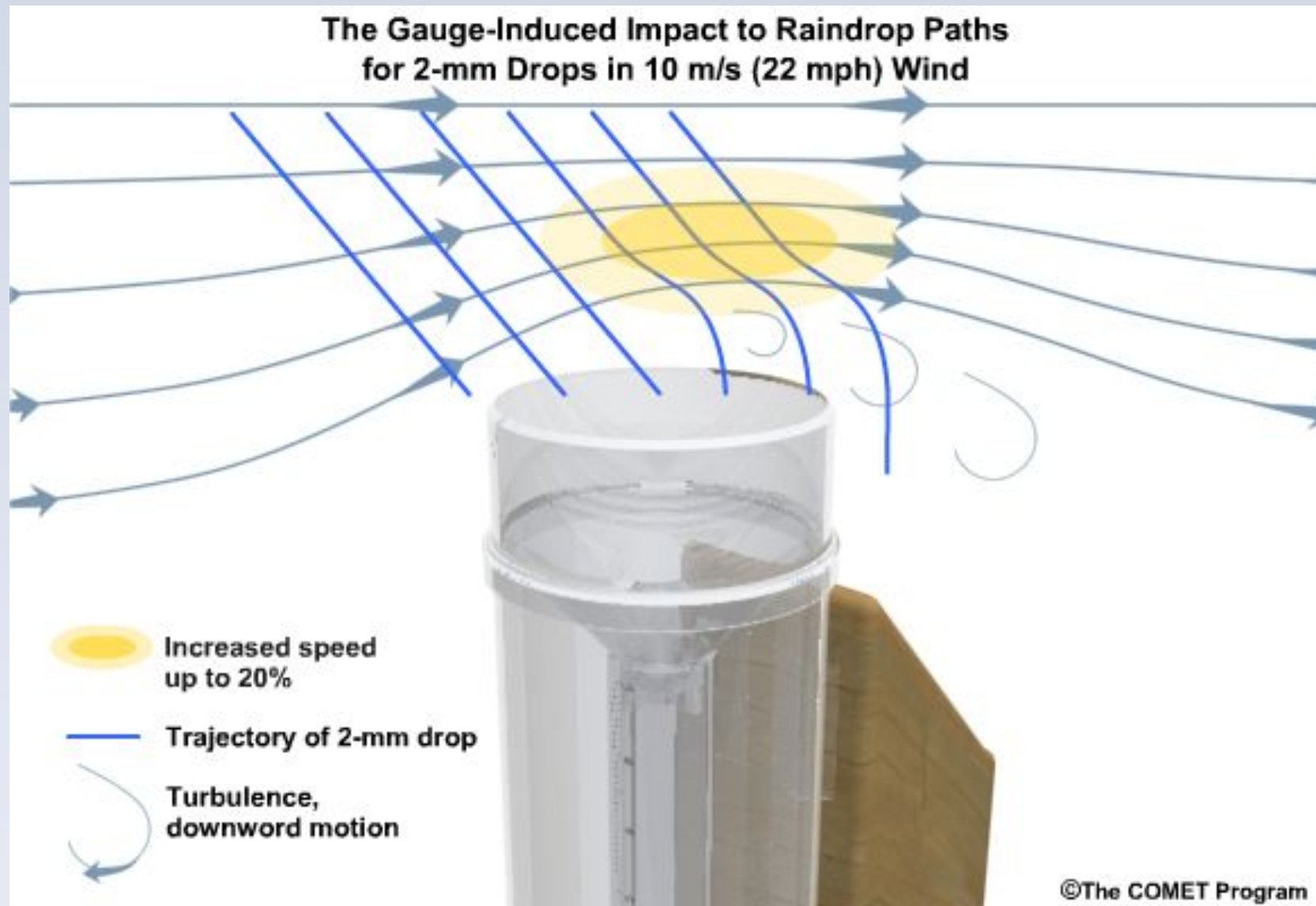


Rain Gauge Enemy: Wind

- Rain gauge snow, wind and catch



Some Rain may be Deflected Around Gauge

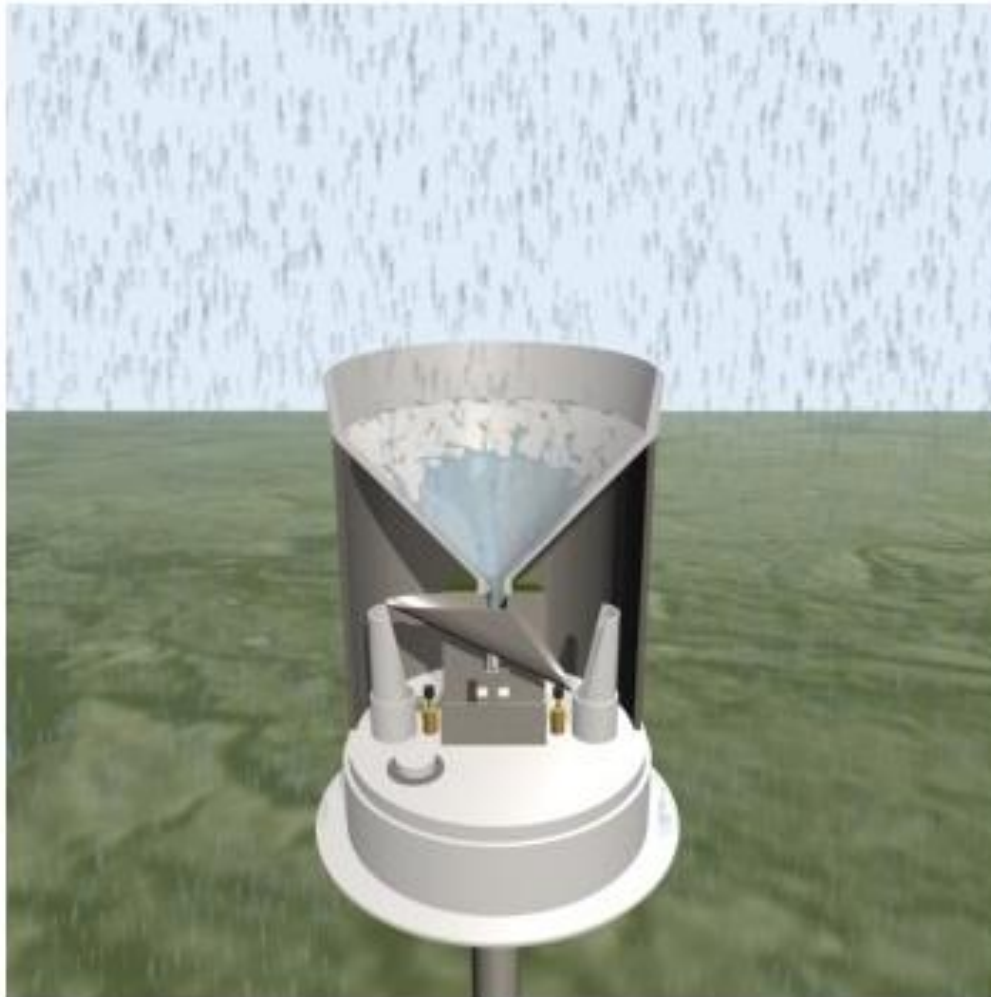


Wind Screens Help with Gauge Catch



Tipping Bucket Gauge

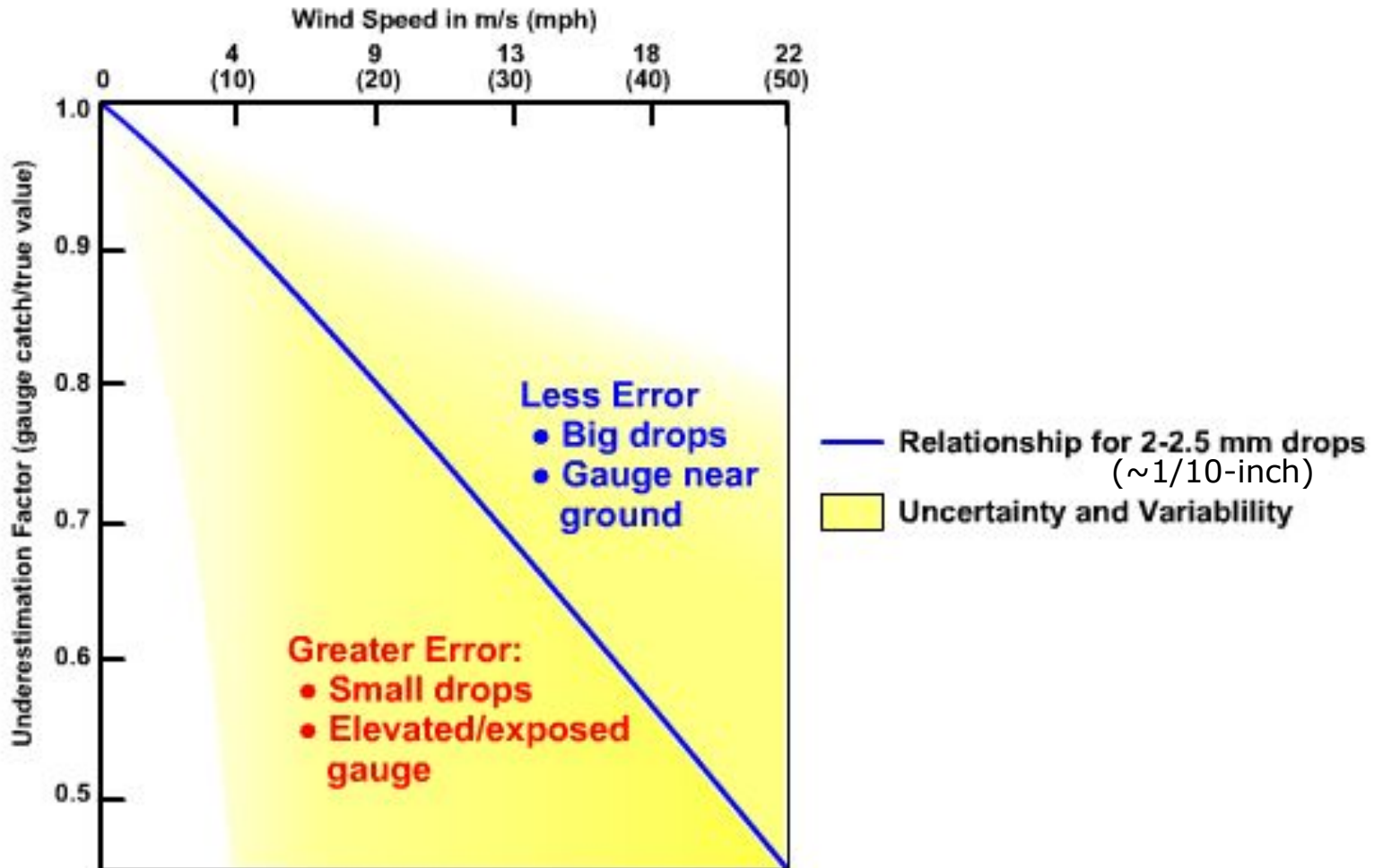
The Inner Workings of a Tipping Bucket Rain Gauge



©The COMET Program

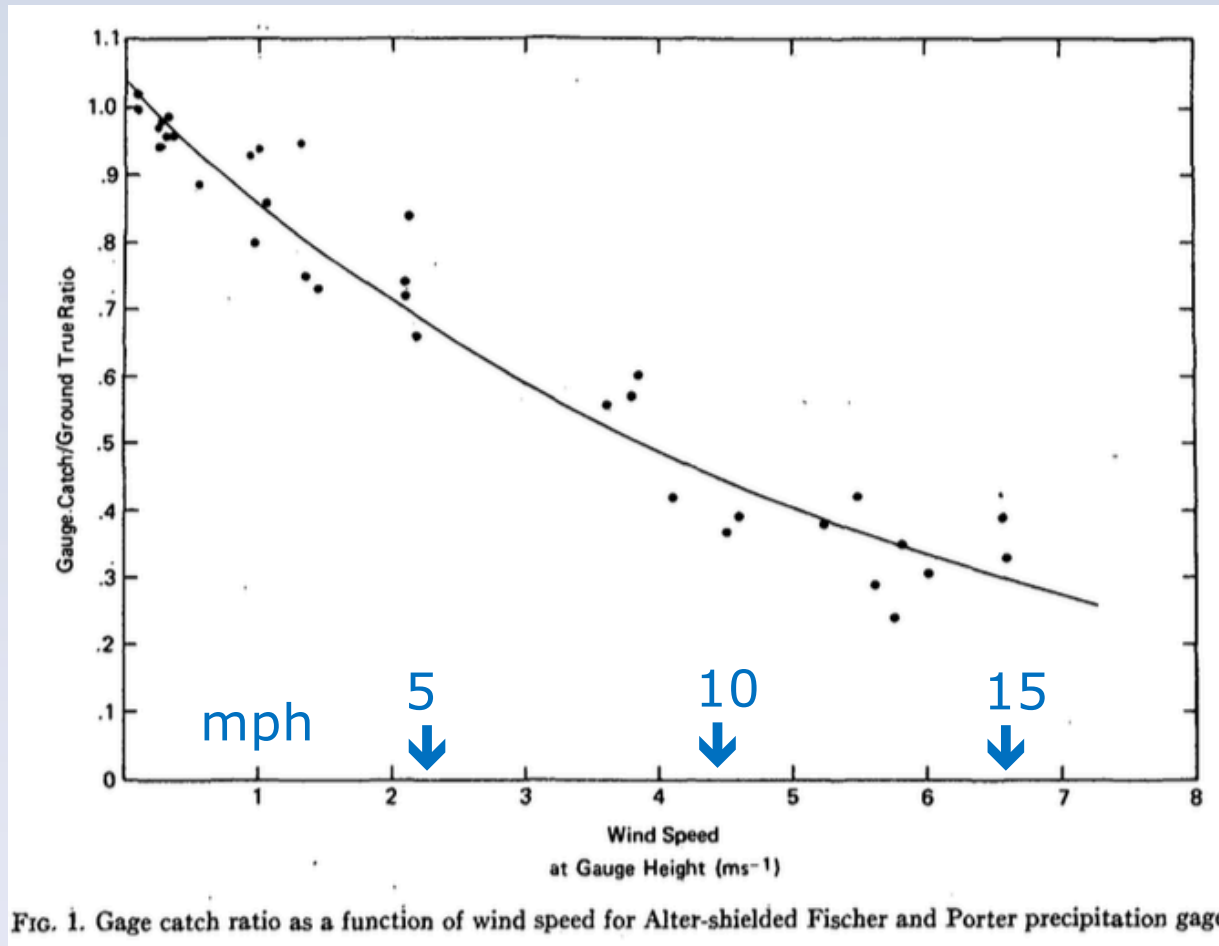
Gauge Catch and Wind

Relationship Between Wind Speed and Gauge Measurement for Liquid Hydrometeors



©The COMET Program

Gauge Catch & Wind



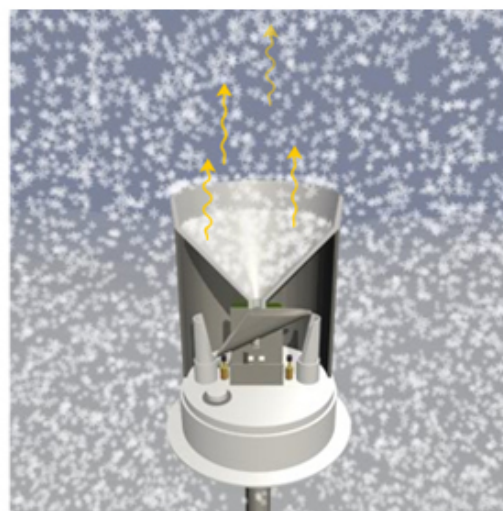
Wind: Greatly reduced gauge catch in snow for exposed gauges

CoCoRaHS Gauges: No Heating Problem

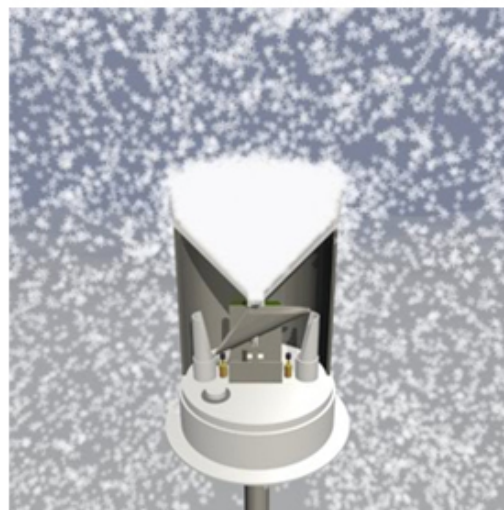
Measuring Snow Water Equivalent
with Heated Tipping Bucket RainGauges



Snowflakes melt, trickle into tipping bucket



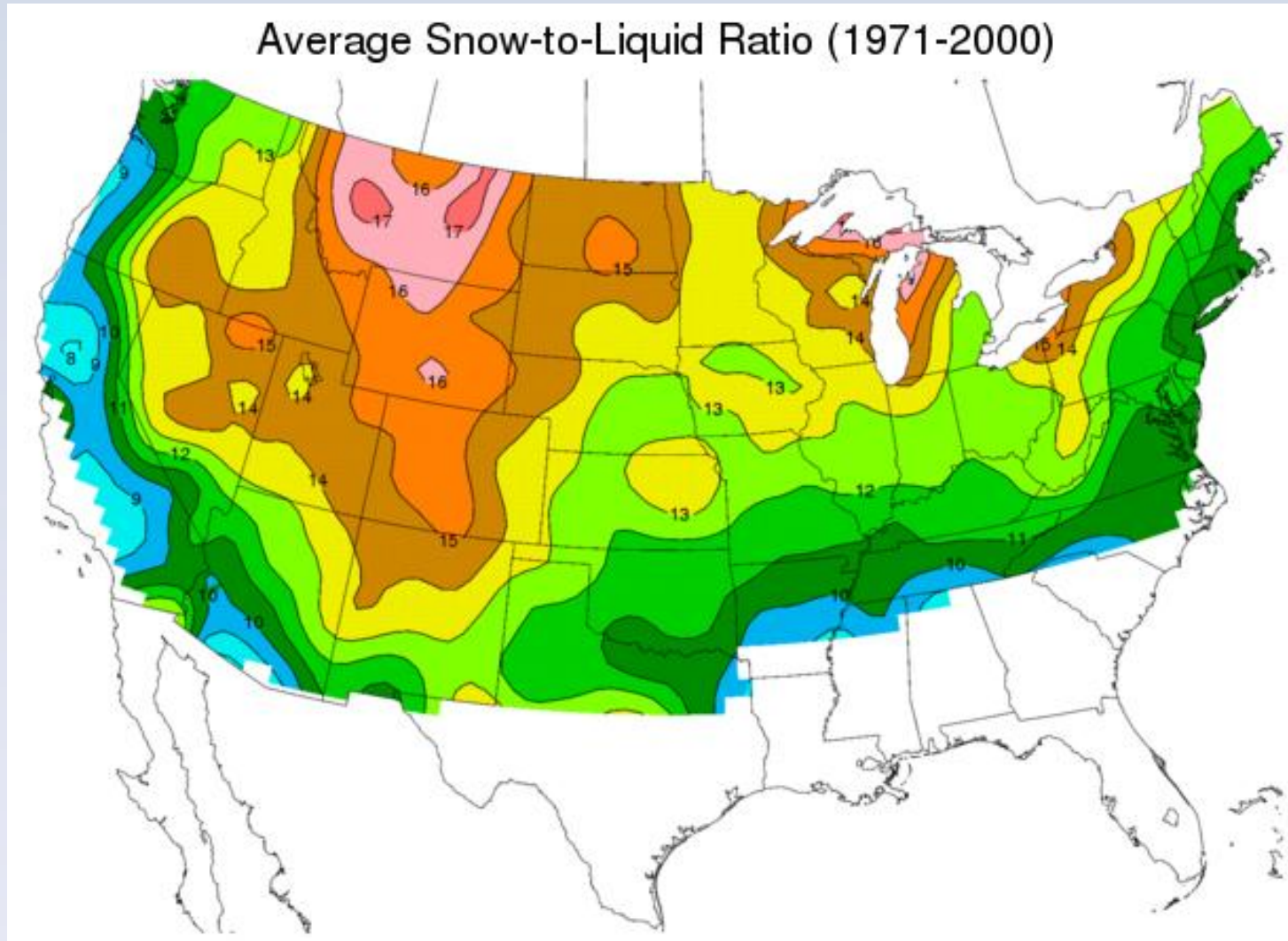
Evaporation/sublimation from gauge funnel

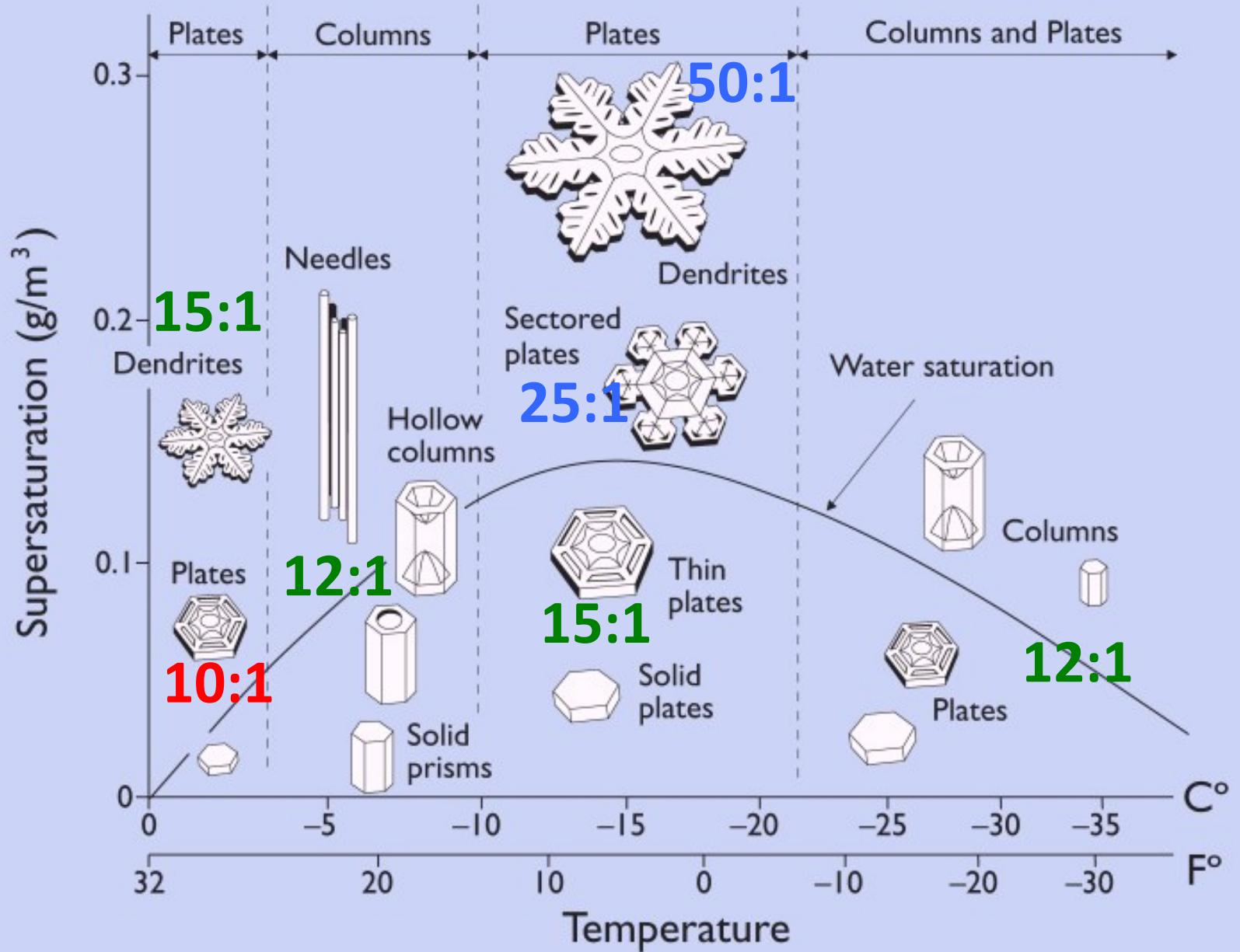


Intense snowfall overflows gauge funnel

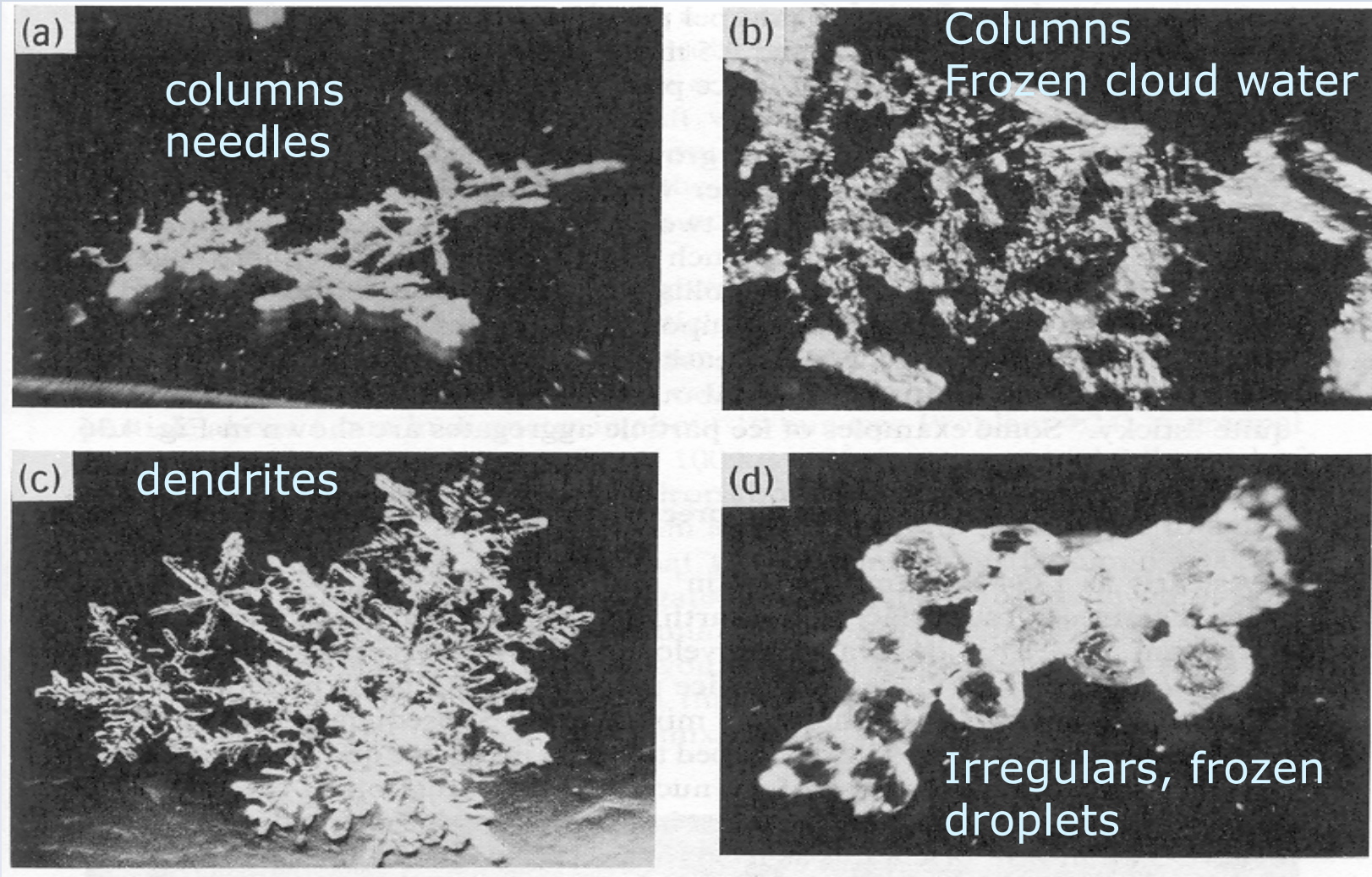
©The COMET Program

Snow-to-Liquid Ratio (SLR) Climatology





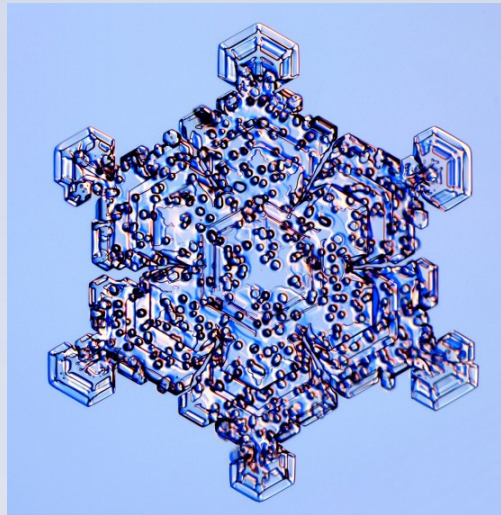
Snow Crystals



- Dendrites make the fluffiest snow (high SLR)

Snow Crystals & Rime Ice

High SLR

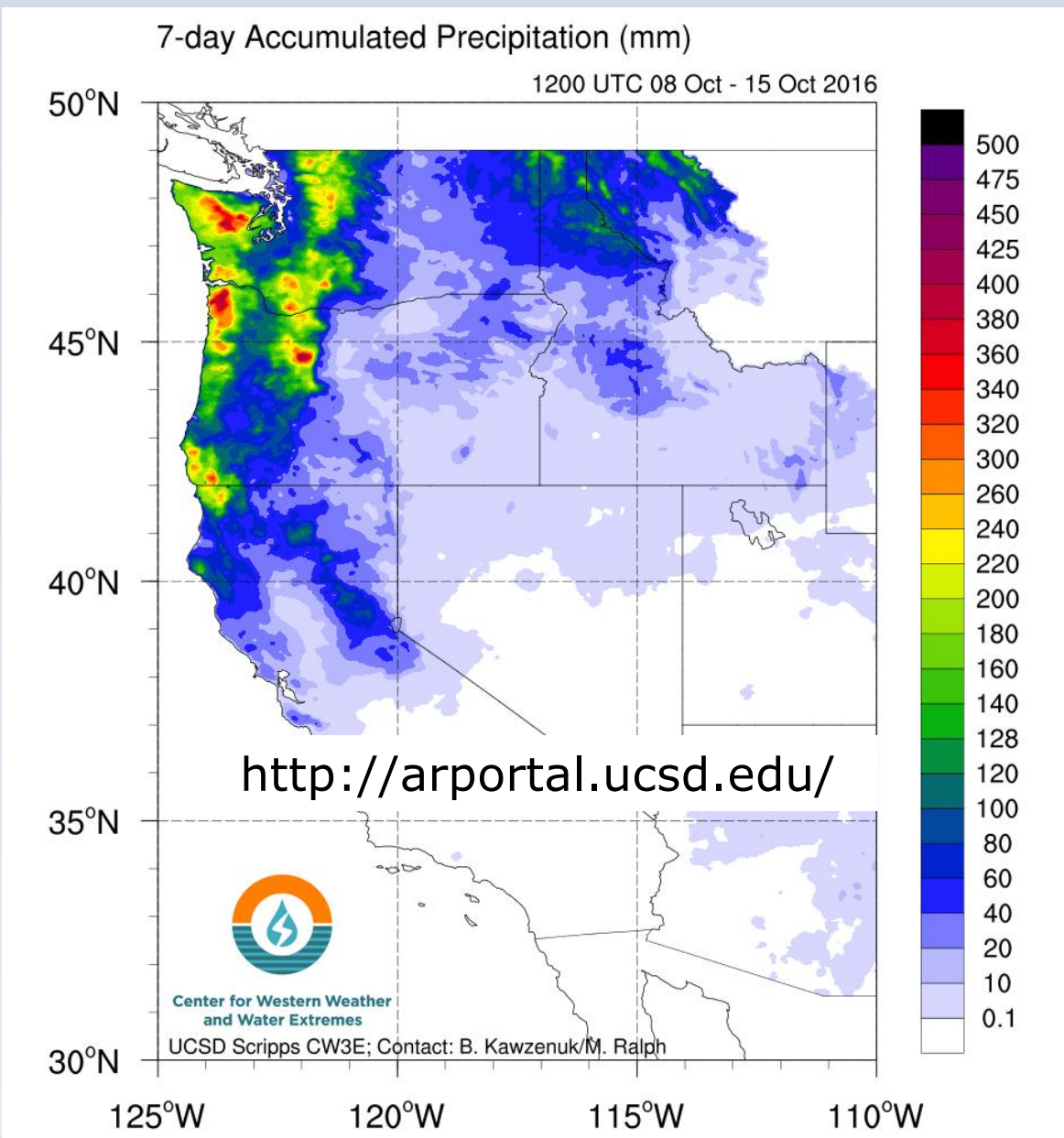


Low SLR



- Dendrites make the fluffiest snow (high SLR)
- Liquid drop in the clouds make snow more dense (low SLR)
 - Rimed

Atmospheric Rivers Portal: October 14-16, 2016

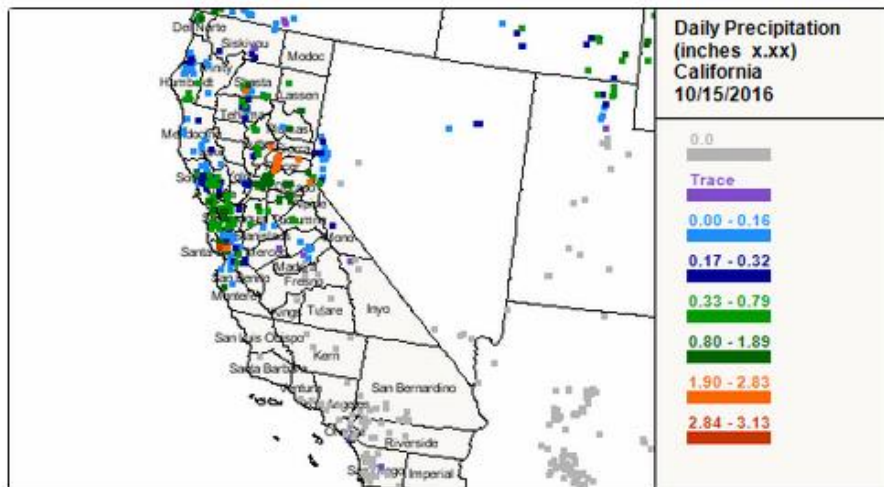


October 15, 2016 from the Atmospheric Rivers Portal

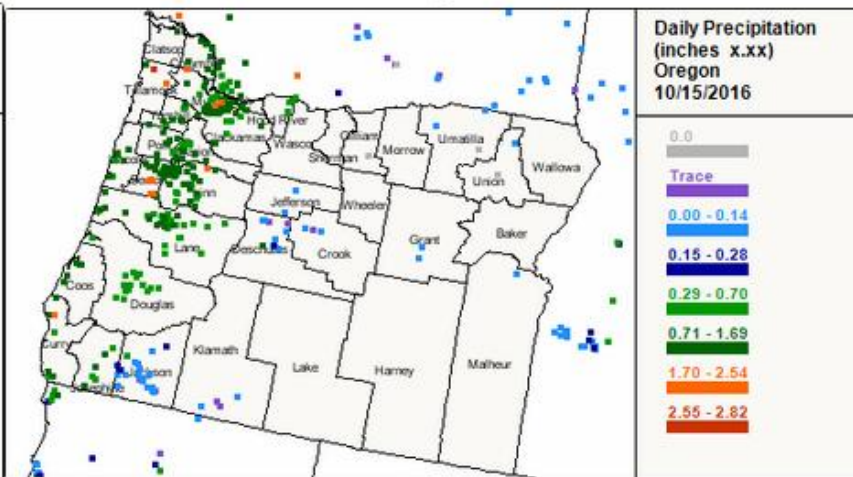
Community Collaborative Rain, Hail & Snow Network (CoCoRaHS)

<http://arportal.ucsd.edu/>

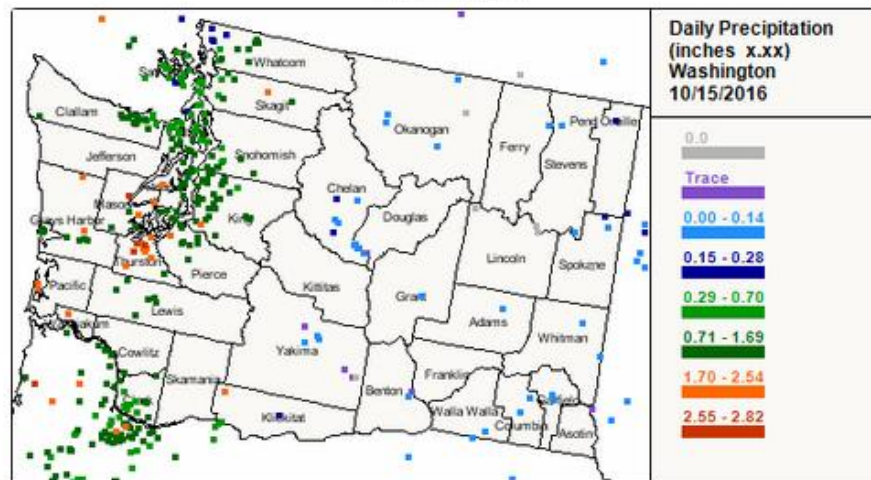
California



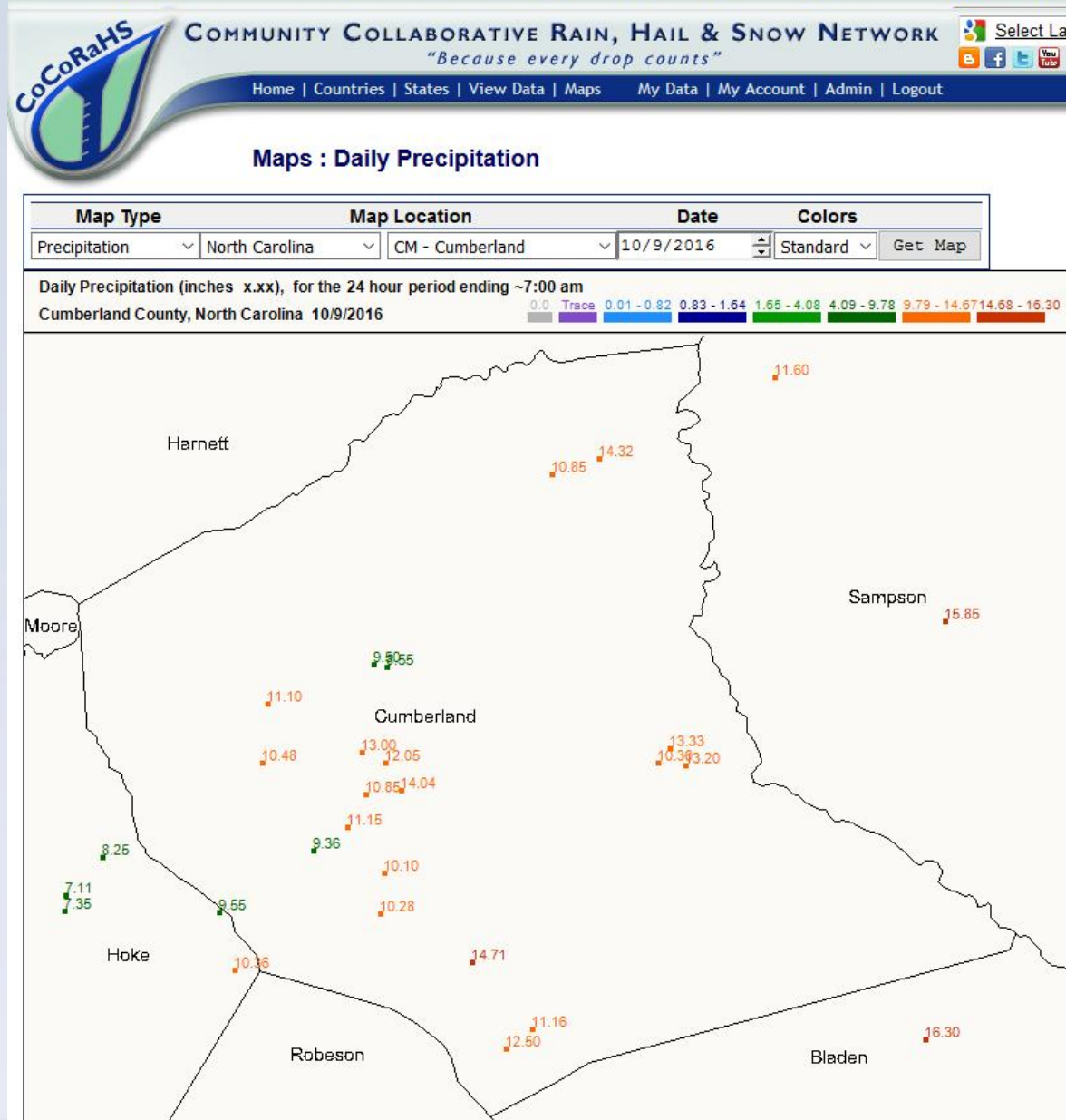
Oregon



Washington

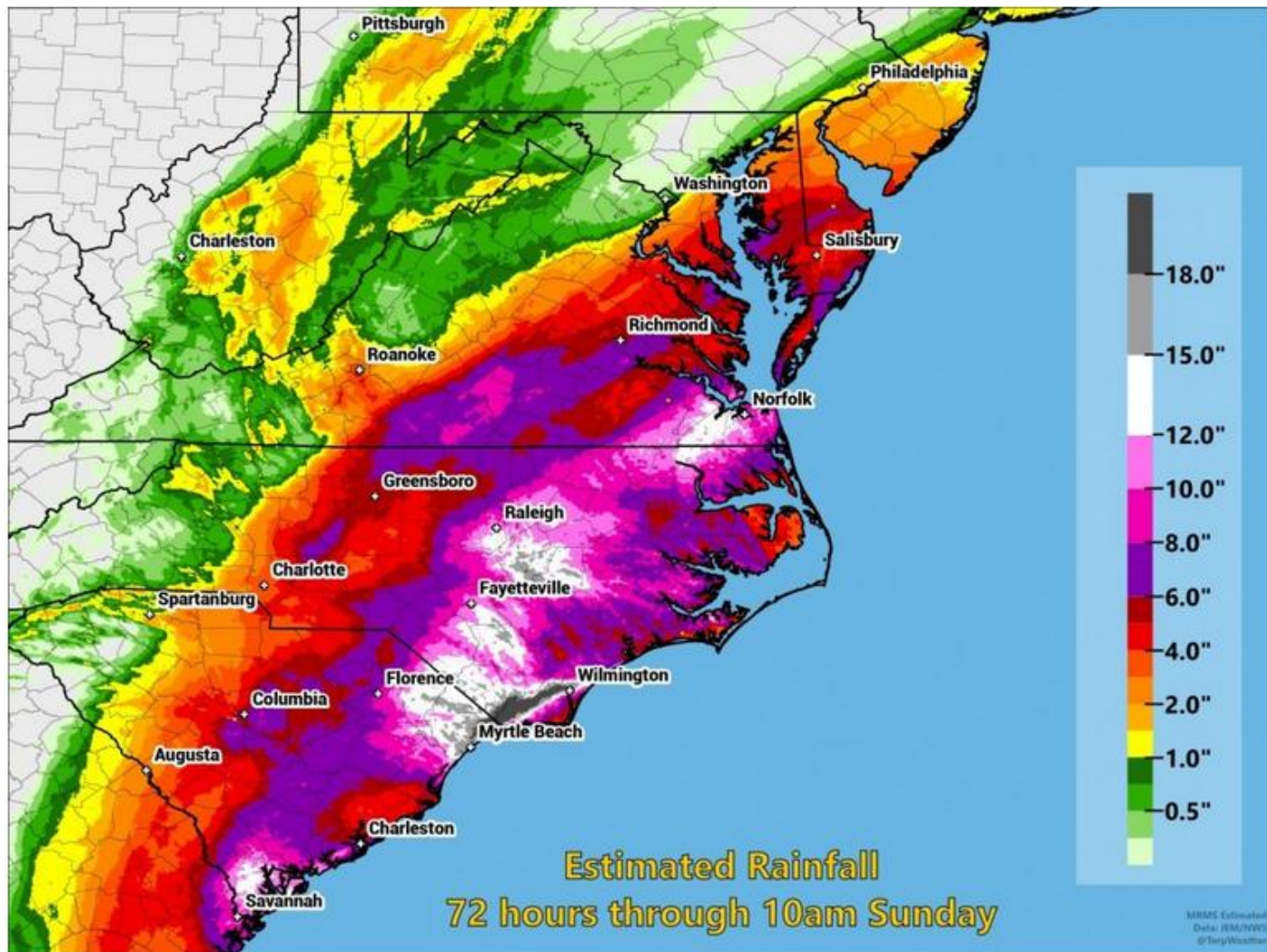


Hurricane Matthew Rainfall, October 9, 2016



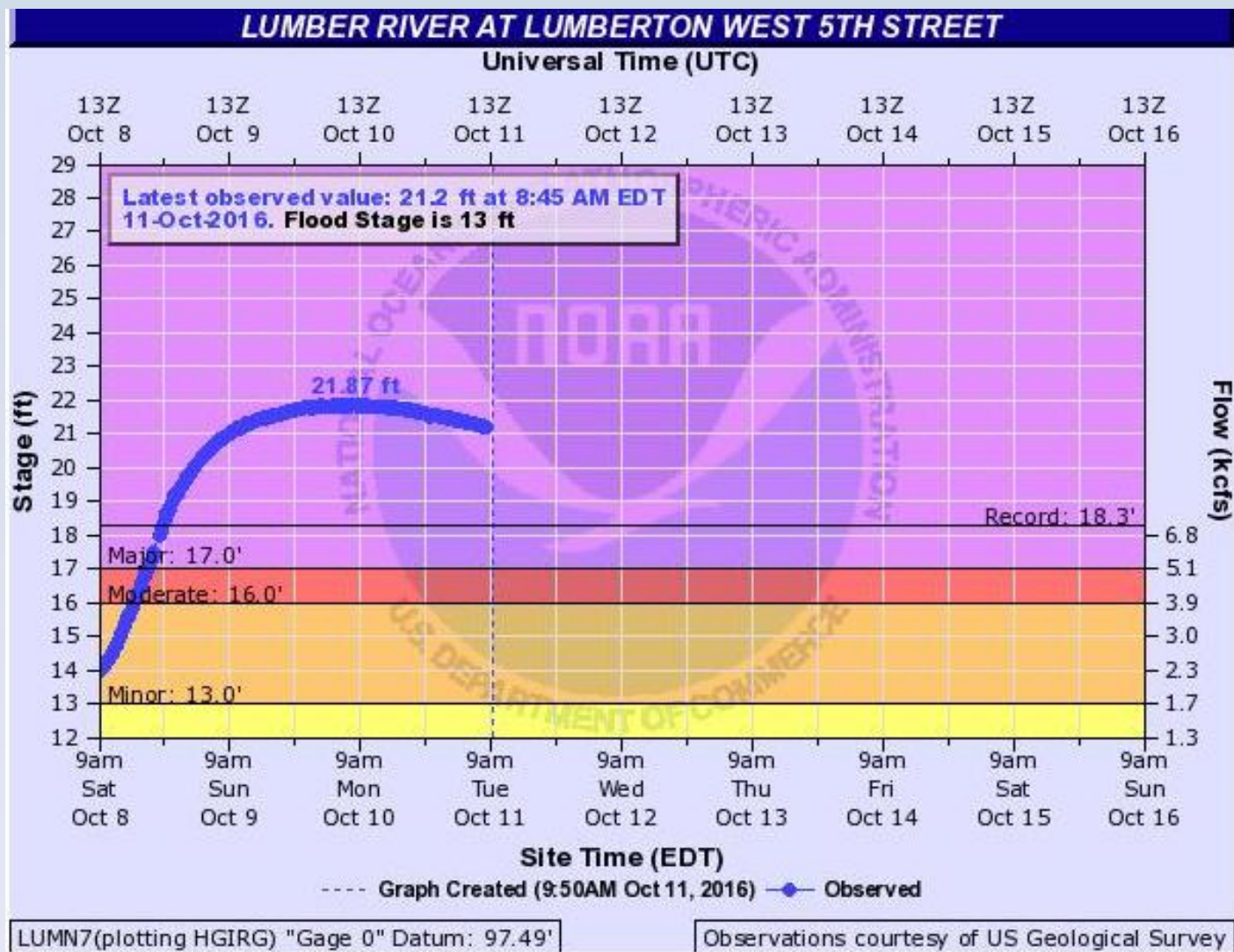
Hurricane Matthew Rainfall, October 2016

Rain



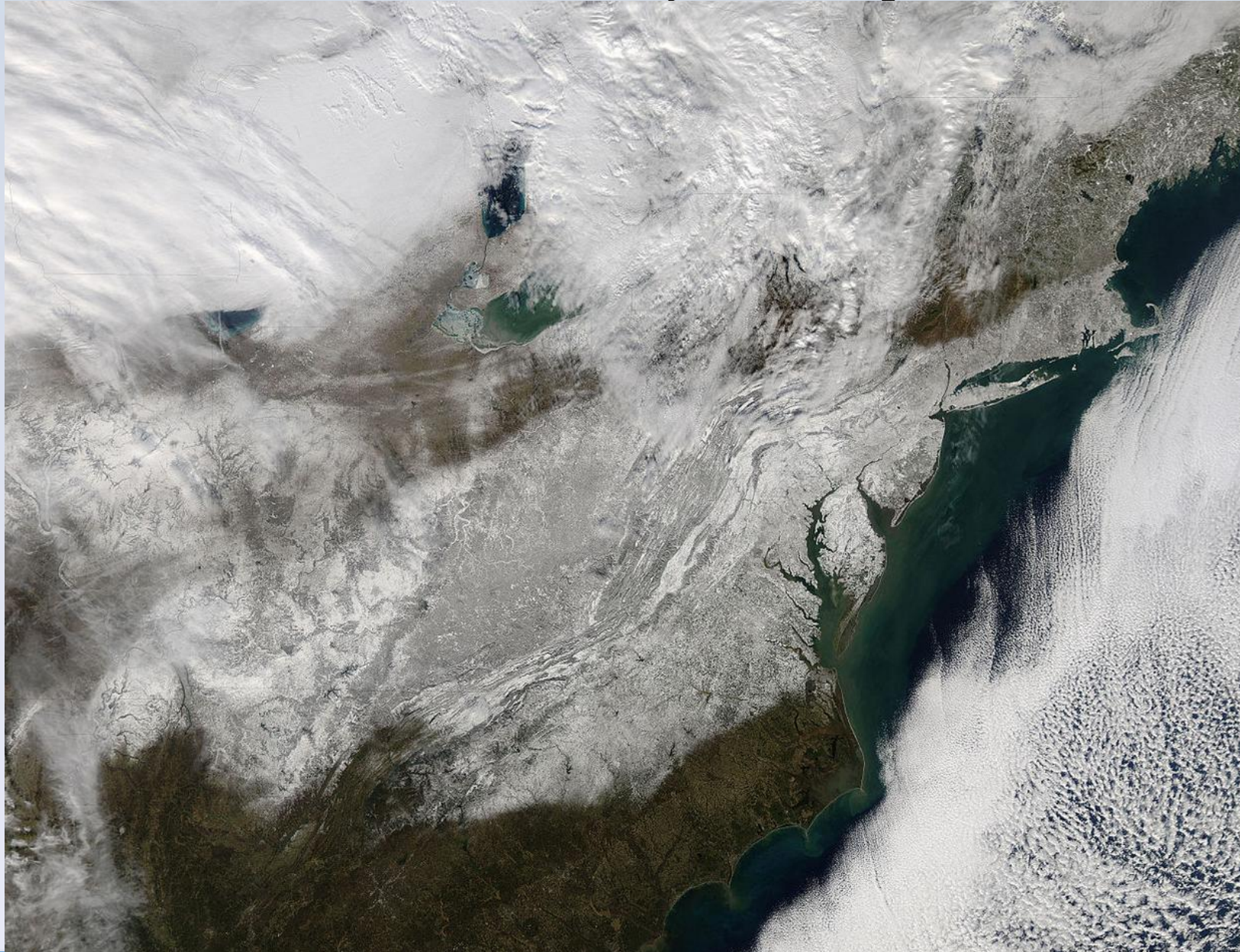
An incredible amount of rain fell during Hurricane Matthew – even by hurricane standards. (Jordan Tessler)

Record Stage, Lumber River

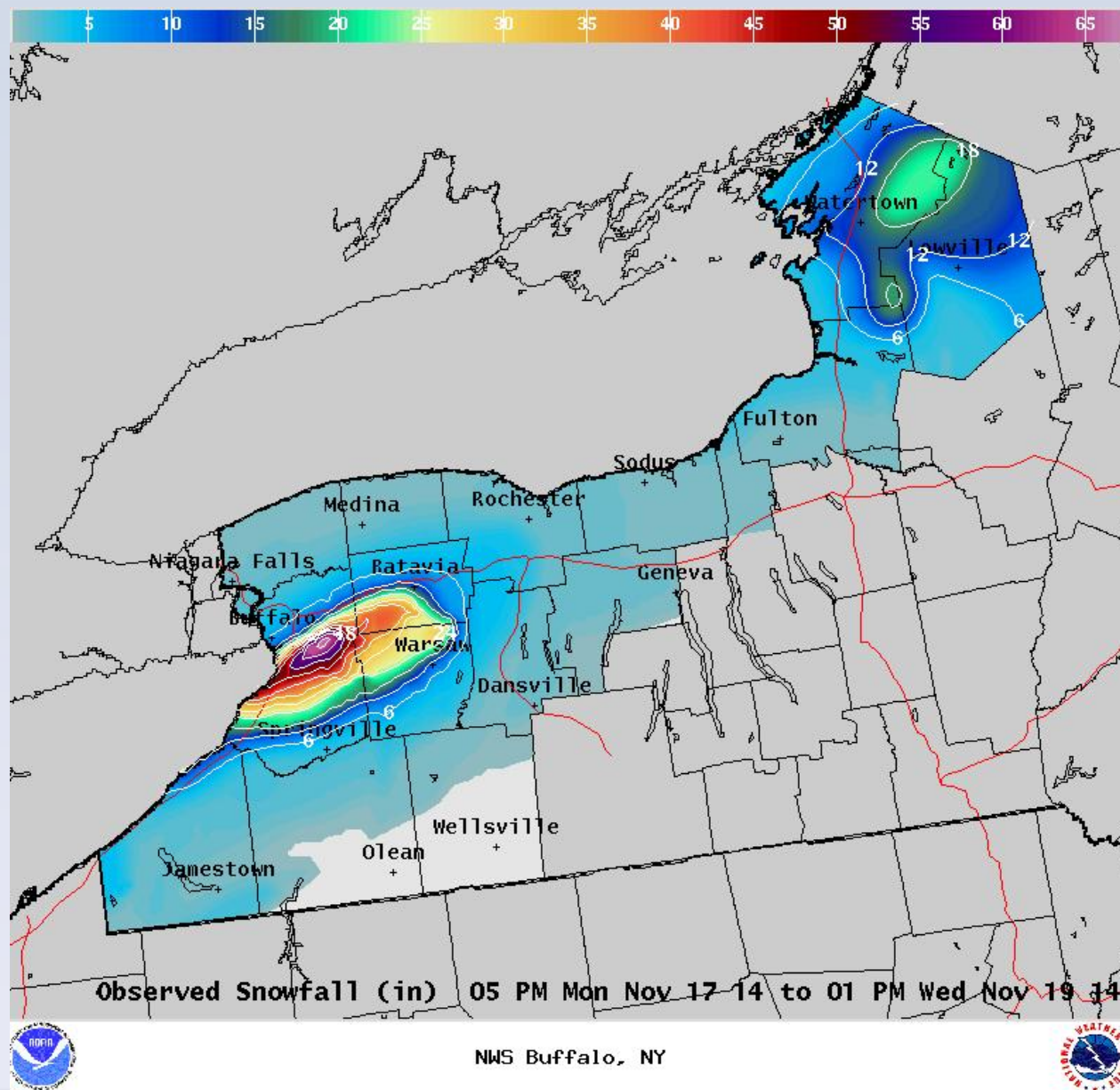


The height of the Lumber River in downtown Lumberton, N.C., rose to 21.87 feet on Monday morning. The old record height was 18.3 feet. (National Weather Service)

Snowstorm, 24 January 2016



Localized Lake Effect, November 18-19, 2014



NWS Buffalo, NY



Buffalo, NY, November 17, 2014

<https://www.youtube.com/watch?v=KA9XNRHxKbg>



Time-Lapse of Buffalo Lake Effect Snow - Nov 18 2014

Other COMET Online Lessons

- Severe Weather, spotters
- Flood
- Hurricane
- Fire
- Winter
- Oceans, tsunami
- Climate

Questions?

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- Dr. Greg Byrd, byrd@ucar.edu
- Matt Kelsch, kelsch@ucar.edu

www.meted.ucar.edu