Theme 1: Observing the Physical System

Water Cycle - Summary

Allen B. White

Science Review
12-14 May 2015
Boulder, Colorado
OAR Science Questions Addressed

• **How can we improve forecasts, warnings, and decision support for high-impact weather events?**
  - Improved process understanding of key physical problems
  - Work with data assimilation and parameterization experts to test new methods that result in improving NWP skill.

• **What are the best observing systems to meet NOAA’s mission?**
  - Conduct field experiments to test new gap-filling instruments and integrated observing strategies
  - Exploit NOAA’s current observing assets using innovative techniques
Notable Successes with Respect to Water Cycle Science

- PSD is a leader in observing system science and physical process understanding
- PSD is a leader in executing integrated, multi-platform field campaigns to further the understanding of our environment
- PSD is a leader in wave propagation theory and applications
- PSD has unique and innovative observing capabilities and highly skilled engineering talent to support fast response and the other scientific needs of NOAA and external stakeholders
Future Directions

• Make PSD’s observational data, tools, and research products more readily accessible
  ▪ (Ex: Implement AWIPS-2 capability within PSD)

• Continue to innovate on observing system science
  ▪ (Ex: Spaced-antenna wind profiler system)

• Work with stakeholders to improve water science and services
  ▪ (Ex: Advanced Quantitative Precipitation Information [AQPI] project with City of San Francisco)

• Collaborate with other teams in PSD and GSD focused on Modeling and Data Assimilation to make improved predictions
  ▪ (Ex: Use CalWater 2015 and HMT observations of ARs to assess forecast skill)
What You Heard

1-1. Ryan Spackman: CalWater 2015
   Processes leading to too much or too little water in California

1-2. Jessie Creamean: Linking aerosols and precipitation
   Role of aerosols in modulating orographic precipitation

1-3. Chris Fairall: Advances from CALWATER2/VAMOS/DYNAMO campaigns
   Air-sea interaction and boundary-layer cloud processes impacting ARs and the MJO

1-4. Rob Cifelli: Role of gap-filling radars to improve QPE in complex terrain
   Gap-filling observations and radar algorithm improvements leading to more accurate orographic precipitation estimates

1-5. Valery Zavorotny: Measurements of soil moisture and ocean wind using reflected GNSS signals
   Exploiting GNSS technology to measure soil moisture, snow-depth, and ocean winds