THE NOAA GPM PROVING GROUND AND HYDROMETEOROLOGY TESTBED SOUTHEAST PILOT STUDY (HMT-SEPS)

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Overview

- Global Precipitation Measurement Mission (GPM)
  - Concept
  - SGPMS
  - Proving ground for precipitation products and services
- HMT-SEPS
  - Instrument deployment
  - QPE and QPF goals
  - Extreme precipitation research
- Next Steps
The Global Precipitation Measurement Mission (GPM)

- Retrieval of global precipitation from space
- Primary sensors
  - DPR (JAXA) – Ka/Ku band radar (successor to TRMM PR)
    - Dual frequency helps improve vertical structure of precipitation
    - Dual frequency improves sensitivity to lighter precipitation
  - GMI (NASA) – 13 channel (10-183 GHz) conically scanning radiometer (successor to TRMM TMI)
    - Enhancement for cold season precipitation over land
- MOU between NASA and NOAA
  - NOAA receiving test data sets
    - NESDIS, JCSDA, NWS
- NOAA involvement in GPM
  - Steering Group on Precipitation Measurement From Space (SGPMS)
  - Joint activities on PMM Science Team
  - Developing roadmap for “One NOAA precipitation Product Enterprise”
NOAA’s Steering Group on Precipitation Measurement from Space

**Co-Chairs**
- Rob Cifelli (OAR)
- Ralph Ferraro (NESDIS)
- Pingping Xie (NWS)

**Advisory Board**
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- Mitch Goldberg (NESDIS/JPSS)
- Steve Goodman (NESDIS/GOES-R)
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- Allen White (OAR)
- John Bates (NESDIS/NCDC)

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- Tom Schott
- Bob Kuligowski
- Brian Nelson

**NWS**
- James Yoe (JCSDA)
- Yu Zhang
- Mike Bodner

**OAR**
- JJ Gourley
- Wayne Higgins
- Tilden Meyers
- Gary Wick

**September 2013**

**GPM**
- Monitoring
- Mitigation
- Decadal Trends

**Analysis**
- Nowcasting
- Warnings
- NWP
Some test data from the GPM core

166 GHz V-Pol
NOAA GOES-R and JPSS Synergy with GPM

• **GOES-R** Sensors useful for rapid refresh precipitation estimation and storm monitoring
  • ABI and GLM
  • FY14 New start Risk reduction projects (S. Goodman)
    • Focus - fusion of ground radar and IR rainfall estimates
      • MRMS, MPE, CMORPH
• **GOES-R Proving Ground**
  • Accelerating the use of GOES-R proxy products across NOAA

• **JPSS** Key MW sensors to precipitation
  • ATMS, AMSR-2
    • Part of the GPM constellation
  • FY12 Risk reduction projects (M. Goldberg)
    • ATMS snowfall rates
    • CMORPH enhancements with snowfall rates
    • New call of NOI’s later in FY14

• Evolving NESDIS “Enterprise” Program
  • Common algo/ground system for GOES and JPSS
NOAA HMT Synergy with GPM

- HMT conducts research on precipitation and weather conditions that can lead to flooding
  - Improve physical process understanding
  - Prototype new observations, models, algorithms
  - Evaluate precipitation products
- Foster transition of scientific advances and new tools into forecasting operations
  - A forum for testing NOAA GPM products
  - R2O
- Quantitative Precipitation Estimation (QPE)
  - Major activity area for HMT and GPM
  - NASA IPHEX and HMT-SEPS
HMT-Southeast Pilot Study (HMT-SEPS)

- Planned for May 2013 – September 2014 in western North Carolina (Upper Catawba watershed)
- Operationally-oriented research on extreme precipitation and forecast challenge identification (QPE and QPF)
- NOAA instrumentation plus leverage additional assets from NASA ground validation campaign (IPHEX)
- “Pilot study”: Long-term plan, vision unclear at this time; if value is demonstrated, could consider expanding, prolonging (provided external support could be garnered)
HMT-SEPS Instrument Deployment

- 4 profiler sites and 6 surface meteorology sites
- Additional NASA precipitation gauge and disdrometer added to each surface site

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NC DENR Profilers in Raleigh and Charlotte, NC

- Working closely with the North Carolina State Department of Environment and Natural Resources/Division of Air Quality
- Raleigh, NC (RAL):
  - 915-MHz Boundary Layer Wind Profiler with RASS; MADIS: RALNC
  - ESRL recently repaired – now operational
- Charlotte, NC:
  - 915-MHz Boundary Layer Wind Profiler with RASS; MADIS: CHANC
  - Works; but needs software upgrade for improved clutter removal and melting level detection
- Also in process of adding EPA RTP profiler to MADIS, HMT-SEPS network

Testing from NOAA parking lot: Feb 2013
NOAA GPM Proving Ground and HMT-SEPS: QPE Research

• Purpose: test new algorithms and products, evaluate product performance and facilitate exchange of GPM products within NOAA
  
• HMT-SEPS provides an opportunity to test, evaluate, and compare QPE approaches (i.e., radar, gauge, satellite) as well as an opportunity to improve QPE algorithms

• Goal: develop the best possible QPE for operational users
QPE Evaluation in HMT-SEPS

• Similar to QPE evaluation approach in HMT-West
• Gauge, radar, and satellite QPE
  • MRMS
  • MPE
  • SCaMPR
  • CMORPH
  • Others?
• Data fusion development and testing

MRMS with KPIX radar
MRMS without KPIX radar
Precipitation as an Overarching Theme
Next Steps

• Conduct QPE research objectives related to HMT-SEPS

• Joint participation of NOAA HMT-SEPS and NASA IPHEX

• Flesh out the One NOAA precipitation Product Enterprise roadmap