

Current and Future Global Satellite Precipitation Products with Emphasis on High Latitudes

Ralph Ferraro & Nai-Yu Wang

**National Oceanic and Atmospheric Administration (NOAA)
National Environmental Satellite, Data & Information Service (NESDIS)
AND
The Cooperative Institute for Climate Studies (CICS)
College Park, Maryland**



Current Status/Progress

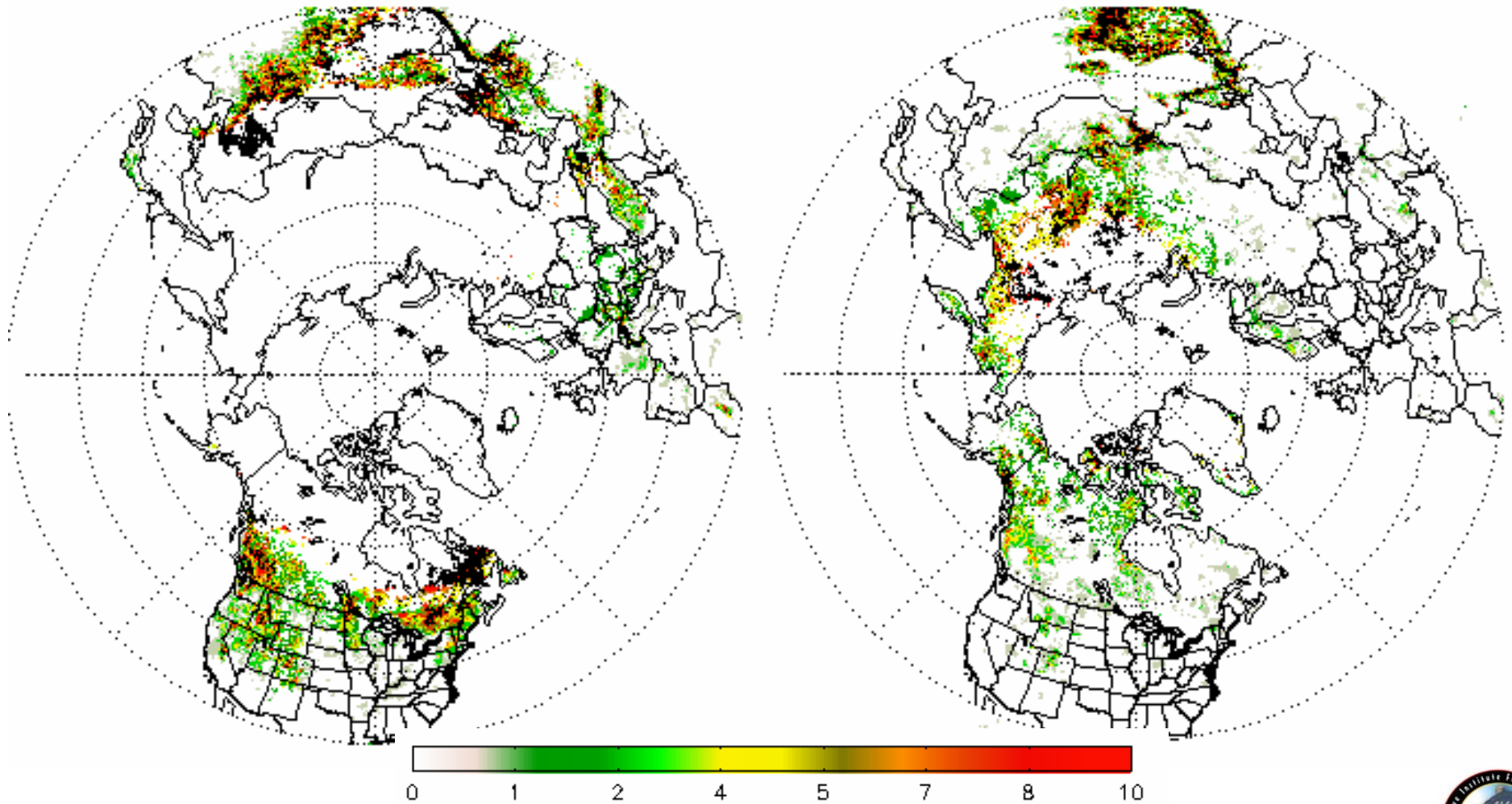
- Excellent potential for cold season precipitation using high frequency, O₂ and H₂O bands
 - NOAA AMSU/MHS operational algorithm (7+ year time series)
 - 89 and 150 GHz bands – IWP and De
 - 50 GHz bands - separate rain from falling snow over land
 - 183 GHz bands - alleviate surface type issues when sufficient water vapor present
 - Snow identification over land
 - Snowfall rates over land under testing
 - Other researchers demonstrating similar potential
 - Skofronick-Jackson, Kim, et al.
 - Liu et al.
 - Bennartz
 - Grecu, Olson
 - Staelin, Chen, et al.
 - Preliminary investigations with SSMIS also promising
 - Development of physical retrieval scheme using full compliment of channels in winter precipitation regimes
 - Current Bayesian approaches severely lack land/winter precipitation regimes
 - Use of recent field campaign and space-borne radar data is vital
 - » C3VP
 - » NOAA's Hydrometeorological Test Bed (HMT)
 - » CloudSat



N-15 AMSU Snowfall Frequency

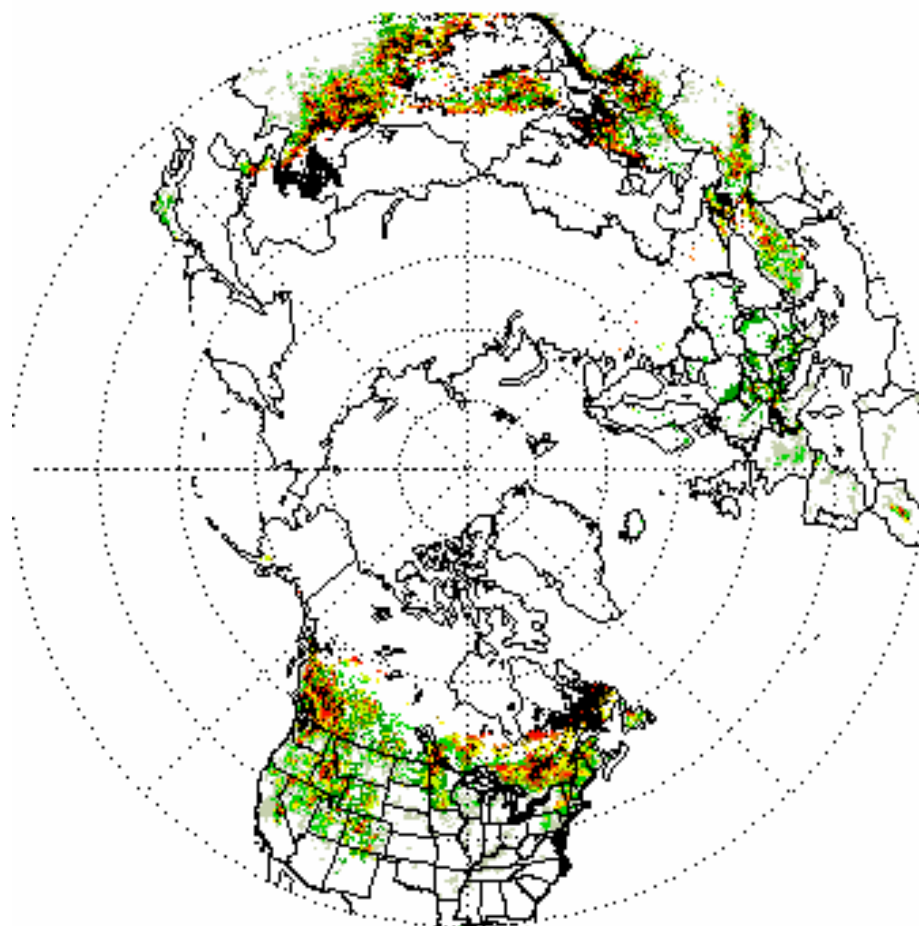
Jan 2006

Oct 2006

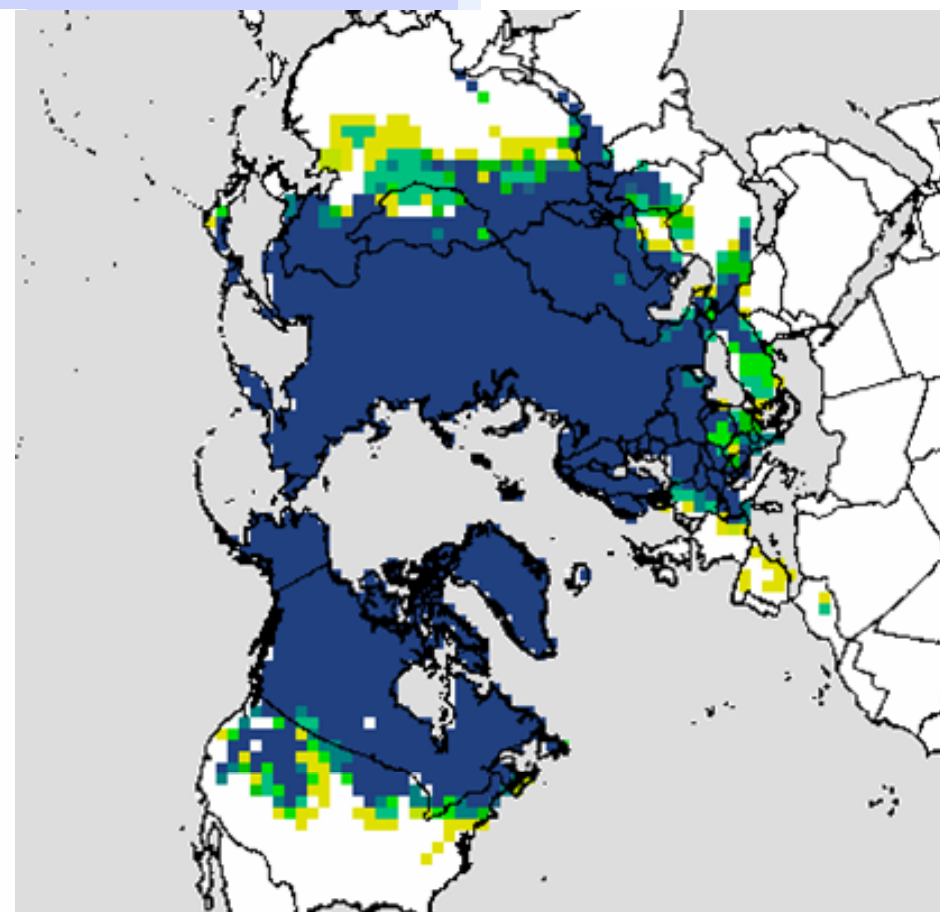


Comparison with Snow Cover

AMSU - Jan 2006



Rutgers Snow Lab – Jan 2006



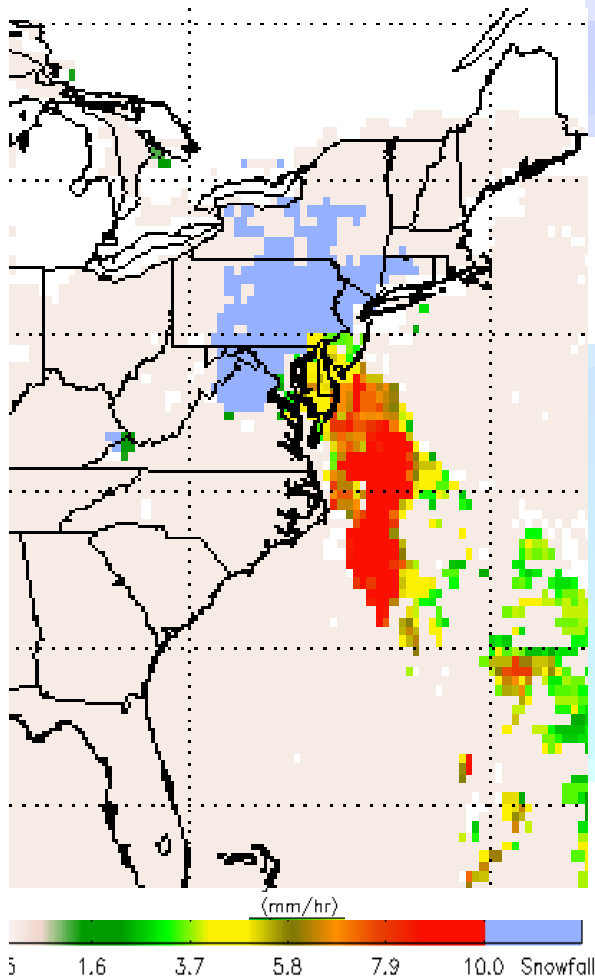
Legend: 100-91 90-81 80-71 70-61 60-51 50-41 40-31 30-21 20-11 10-0



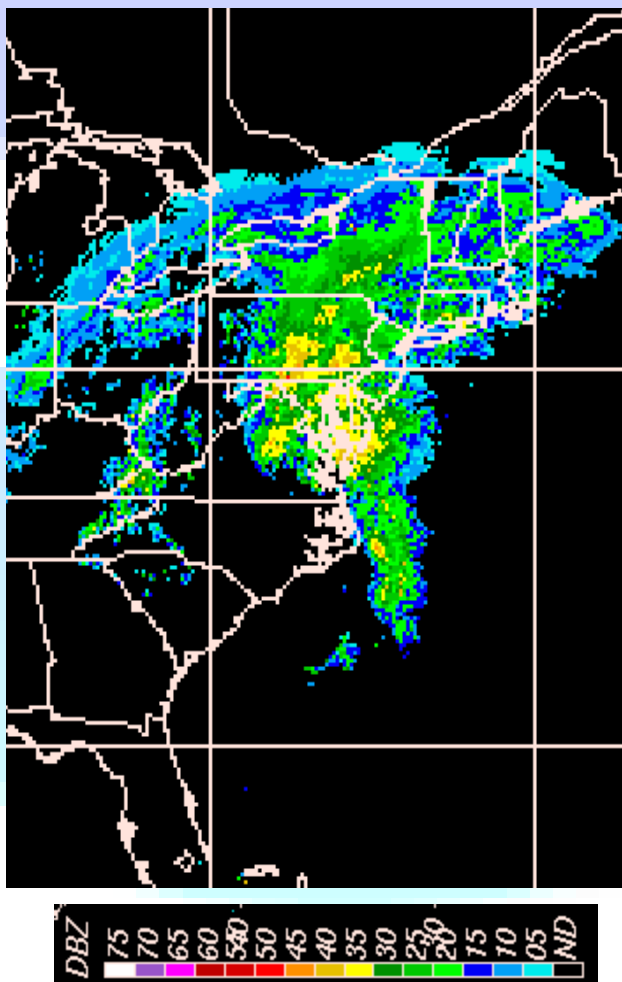
East Coast Snow/Ice Storm – 14 February 2007

NOAA-16

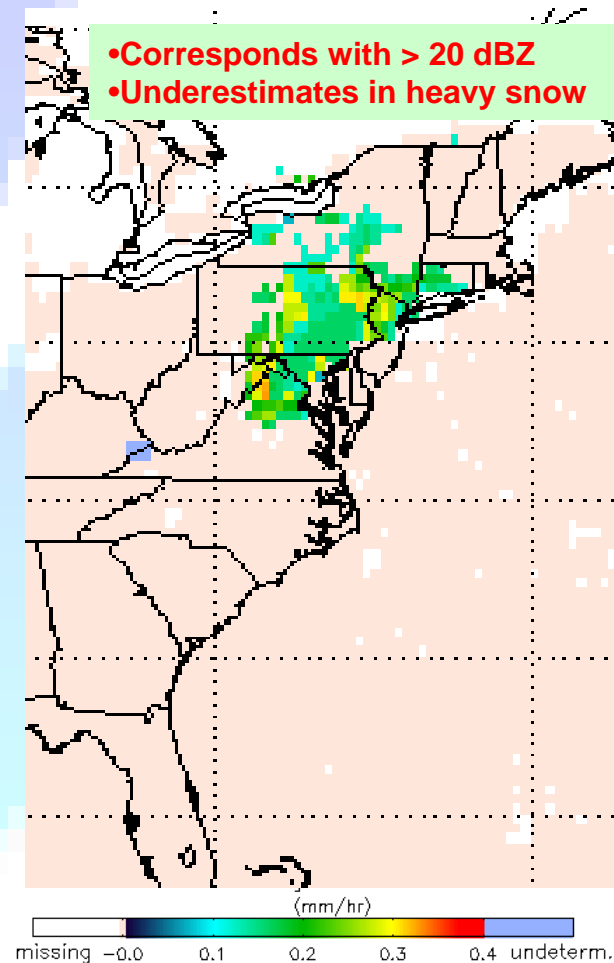
Precipitation Type/Rainfall Rate



NEXRAD Reflectivity



NOAA-16 Snowfall Rate



Current Limitations/Future Direction

- AMSU Snowfall

- Current scheme is empirical and has limitations

- “Global” approach
- Difficult to quantify storm features – cloud thickness and height, moisture content, etc.
- Snowfall rates also difficult to retrieve and validate

NEXT STEPS: Use of sophisticated RTM and storm microphysics needed for a wide variety of winter systems to better understand positives and negatives of this approach

- What are contributions of various channels?

- Use of all channels available has not been thoroughly or systematically evaluated

- O₂ and H₂O bands as regime classifiers?

NEXT STEPS: Use of field campaign (or CRM) and RTM to better understand channel optimization in various storms

