Developing Assimilation Techniques for Atmospheric Motion Vectors Derived via a New Nested Tracking Algorithm Derived for the GOES-R Advanced Baseline Imager (ABI)

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Summary:

Investigate and assess the quality of Atmospheric Motion Vectors (AMVs) derived from a new nested tracking algorithm developed for the GOES-R ABI with respect to the National Center for Environmental Prediction (NCEP) Global Forecast System (GFS). *Assess the impact* of these AMVs on the accuracy of GFS forecasts.

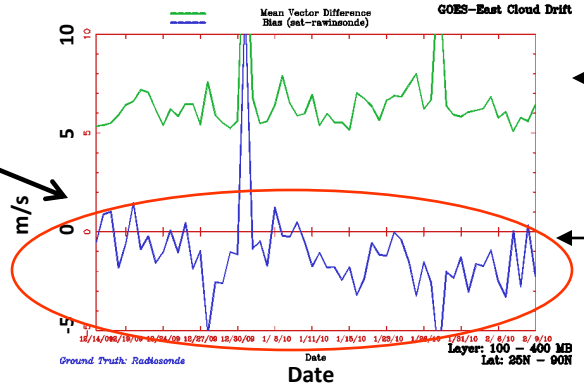
GOES-R Nested Tracking Algorithm

- Designed to minimize observed slow speed bias of satellite winds using heritage winds algorithm; *a significant concern for NWP*
- Computes local motions (nested) within a larger target scene, together with a clustering algorithm, to arrive at a superior motion solution
- Potential for determination of motion at different levels and/or different scales

Please visit poster for more details

Heritage NESDIS Winds Algorithm

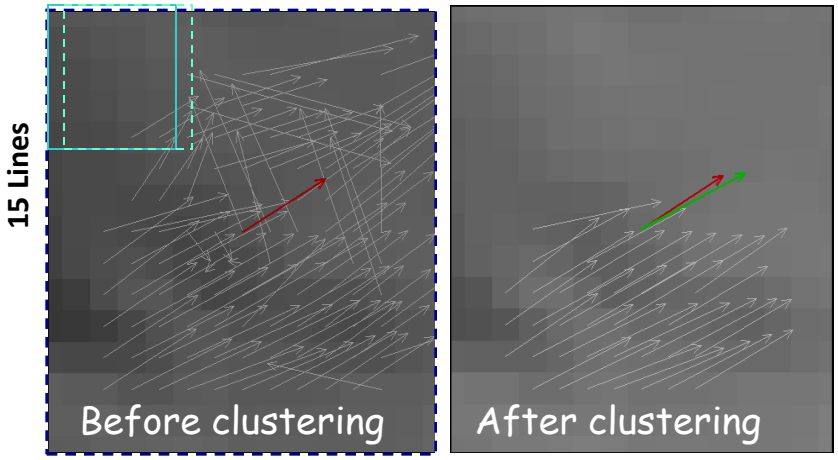
GOES-12 Satwinds vs. Rawinsonde (100-400 hPa)



Mean Vector Difference

Speed Bias

Nested Tracking



Motion of entire box

SPD: 22.3 m/s

Average of largest cluster

SPD: 27.6 m/s

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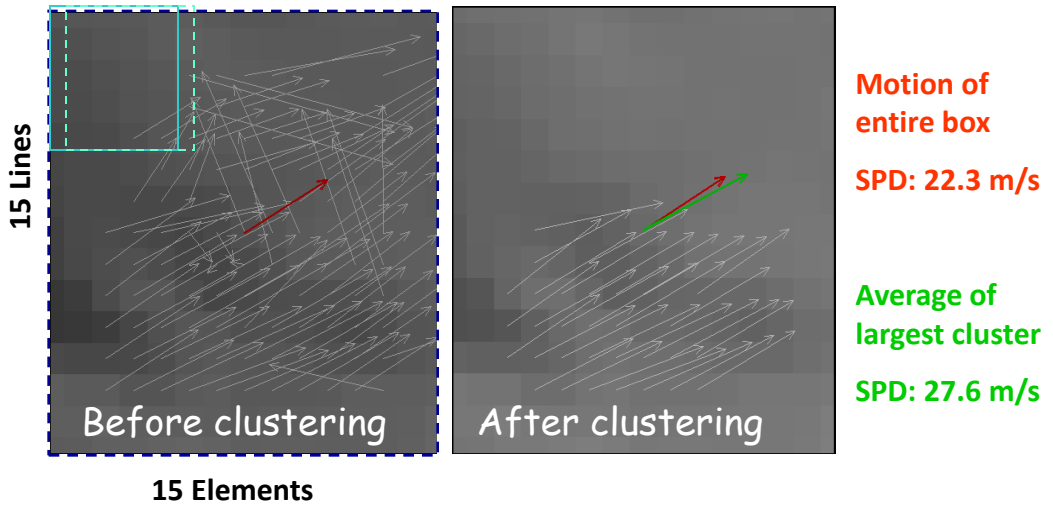
AMV Performance (Nested Tracking vs. Heritage Algorithm)

Table 1: Meteosat-8 AMV/Rawinsonde collocation statistics for August 2006.

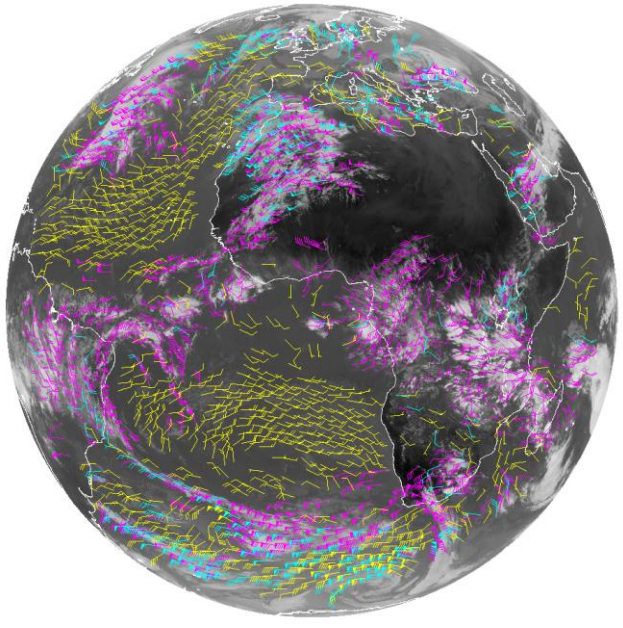
	Traditional Tracking Algorithm	Nested Tracking Algorithm
Mean Vector Difference (m/s)	6.14	5.46
Speed Bias (m/s)	-2.00	-0.18
Avg Speed (m/s)	17.68	17.91
Sample	17362	17428

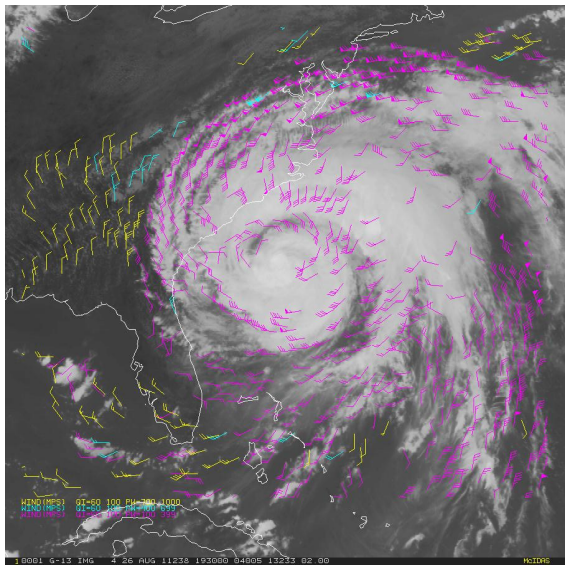
Nested Tracking



Approach

1. Generate AMVs using GOES-R winds algorithm and conduct initial quality control
   - Start with AMVs generated from Met-9/SEVIRI; GOES later
   - Develop new BUFR template
2. Derive initial data assimilation stats (O-B) and develop assimilation quality control procedures
   - Sort on AMV quality indicators, satellite zenith ange, AMV height, cloud phase, cloud type, cluster size, etc
3. Conduct retrospective data assimilation and forecast impact studies
   - Will be done on new S4 computer at CIMSS
4. Conduct end-to-end data assimilation and forecast studies with real time constraints.





Status

- AMVs Meteosat-9/SEVIRI winds using GOES-R AMV algorithm being routine generated at STAR

- Initial set of data assimilation stats (O-B) have been generated for 10 day period (July 2011)
  - Encouraged by what we see
  - Gaussian
  - Centered at zero