Evaluation and Quality Control of Nested Tracking Approach for Atmospheric Motion Vectors (AMVs)

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GOES-R Algorithm Working Group Winds team continues to assess the performance of the Atmospheric Motion Vectors (AMVs) algorithm designated for the GOES-R Advanced Baseline Imager (ABI). The AMVs algorithm uses a nested approach to define a field of wind vectors based on cloud features tracked in smaller target boxes contained within a larger scene. Using density based cluster analysis, the appropriate, average wind vector for the large scene is determined by isolating the dominant cluster from the field of wind vectors. Height assignment is also limited to the mean pressure of the cluster's cloud top pressure. This approach was designed to address the slow bias seen in the mid to upper level AMVs located in the extra-tropics for the current operational algorithm.

To test this new approach for GOES-R ABI, proxy data was created using imagery from Meteosat-9 Spinning Enhanced Visible Infra-Red Imager (SEVIRI). The initial validation of the AMVs against rawinsonde observations has been completed. Evaluation continues with comparisons of AMVs with the background assimilation state of the NCEP Global Forecast System (GFS). Examination of the statistics of the difference between the AMVs and the GFS background state will reveal appropriate quality control procedures for this new wind product. Parameters unique to this nested tracking approach algorithm such as uncertainties of the height assignment, sample size of the dominant cluster, cloud type of the cluster, will be included for consideration when determining quality control procedures.

Results will be shown of the algorithm AMVs as compared to the GFS data assimilation system (GDAS) background state including a focus on the AMVs in the mid to upper levels of the extra-tropical atmosphere. An assessment of algorithm parameters as candidates for use in quality control procedures will also be presented. Future work will include GFS forecast impact studies for this nested tracking approach algorithm.