



Evaluation and Quality Control of Nested Tracking Approach for AMVs

GOES-R ABI AMV Algorithm using proxy data from SEVIRI

Sharon Nebuda Cooperative Institute for Meteorological Studies, University of Wisconsin-Madison (CIMSS)

Jim Jung CIMSS & Joint Center for Satellite Data Assimilation

Dave Santek CIMSS

Jamie Daniels NOAA Satellite Applications and Research

Wayne Bresky I.M. Systems Group

Planned Work

- Evaluation of proxy GOES-R ABI AMV for 2 different seasons (Obs-GFS Background)
- Investigate quality control procedures
- Assimilate AMVs for 2 seasonal GFS runs
- Evaluate AMV performance (Obs-GFS Assimilation)

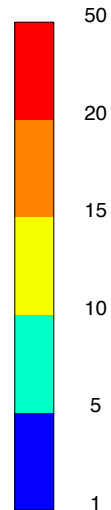
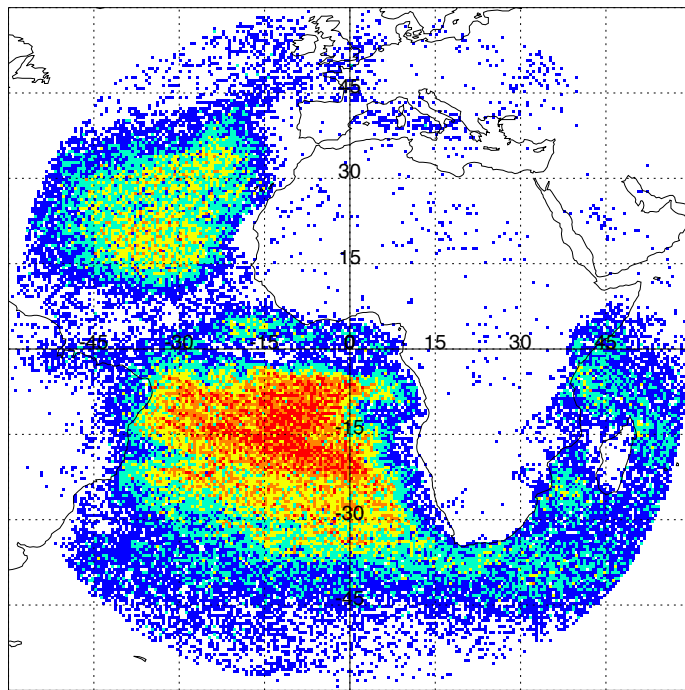
Presenting

- One season Obs-Background for ABI channel 14
- Preliminary evaluation of QC parameters

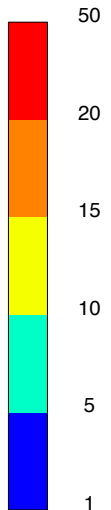
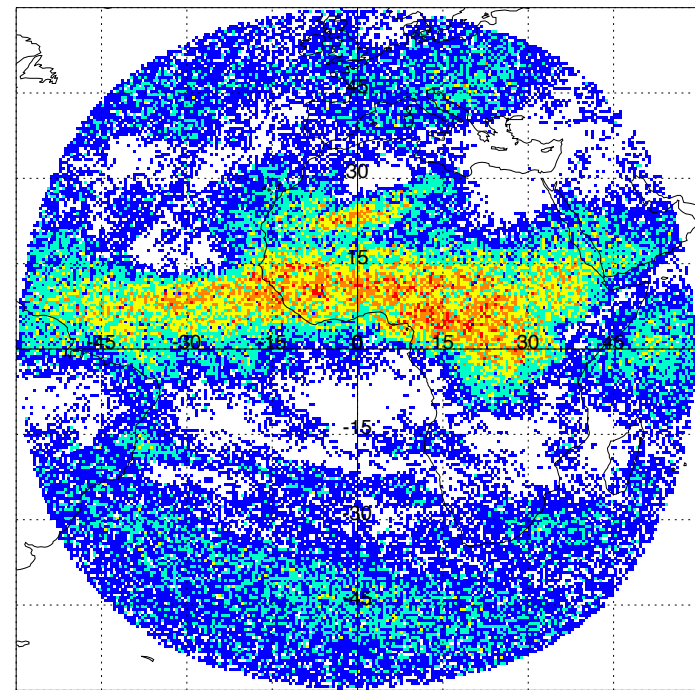
AMV location for July 25 to Aug 2, 2011

Color indicates number in the lat/lon box. Total number of AMVs is 364,614 using 11 micron SEVIRI proxy data at synoptic times without quality control limits.

Below 800 mb

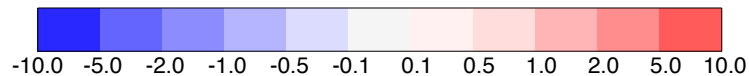
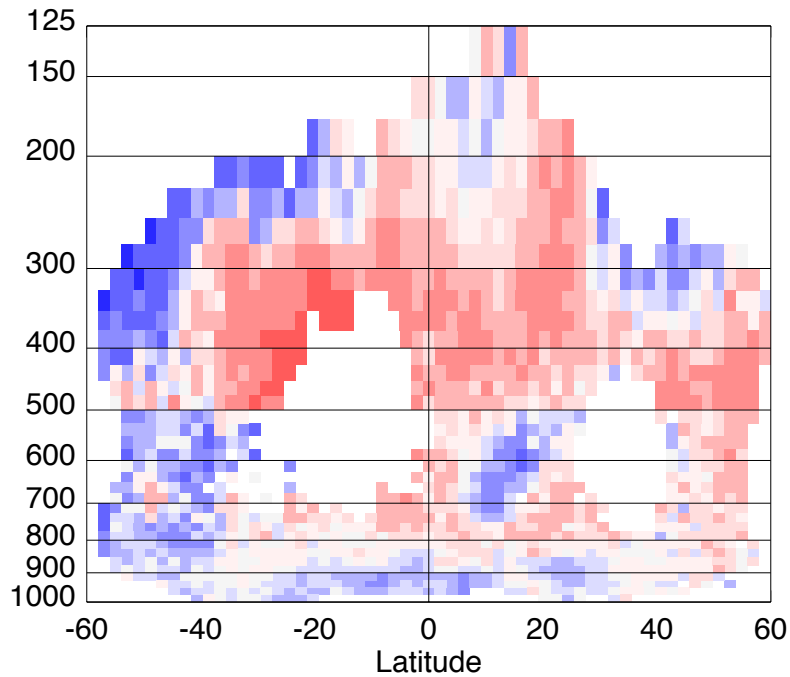


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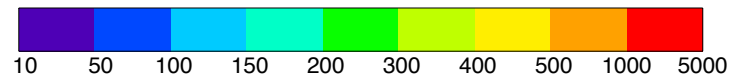
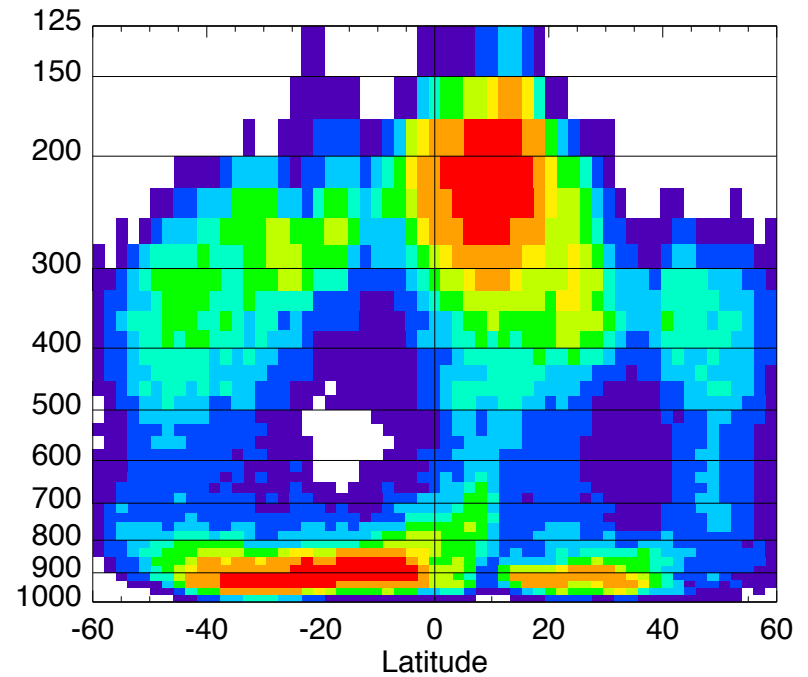


Zonal mean for O-B Speed

Speed O-B (m/s)

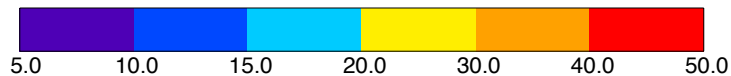
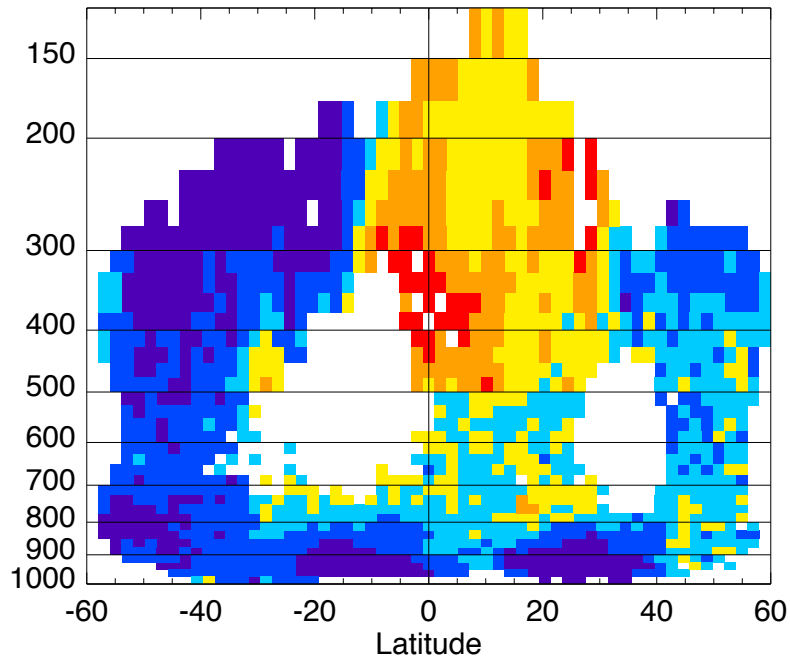


Number Obs in Lat/Pressure Bin

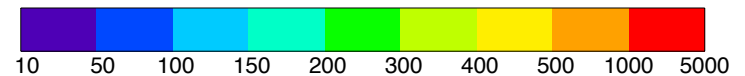
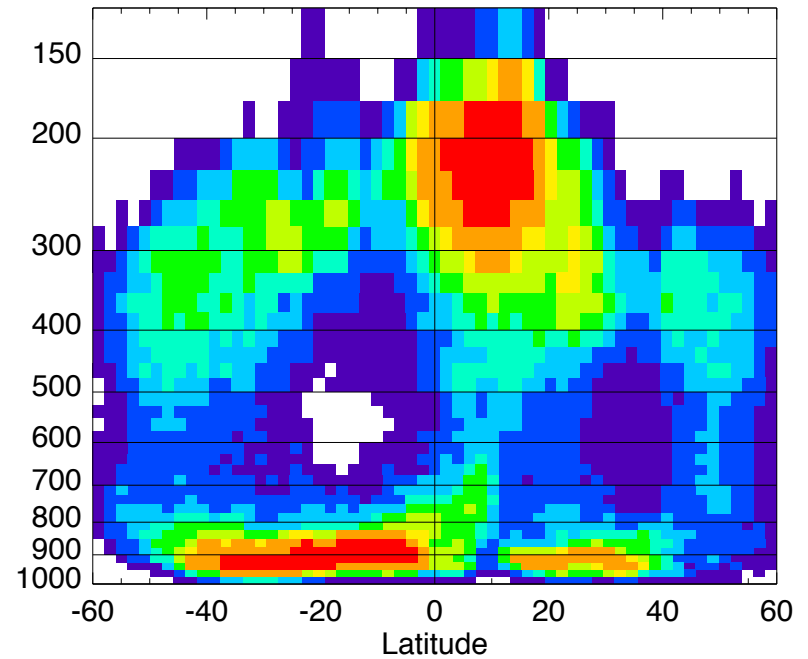


Zonal mean for |O-B| Direction

Direction |O-B| (deg)



Number Obs in Lat/Pressure Bin



O-B Stats vs Pressure

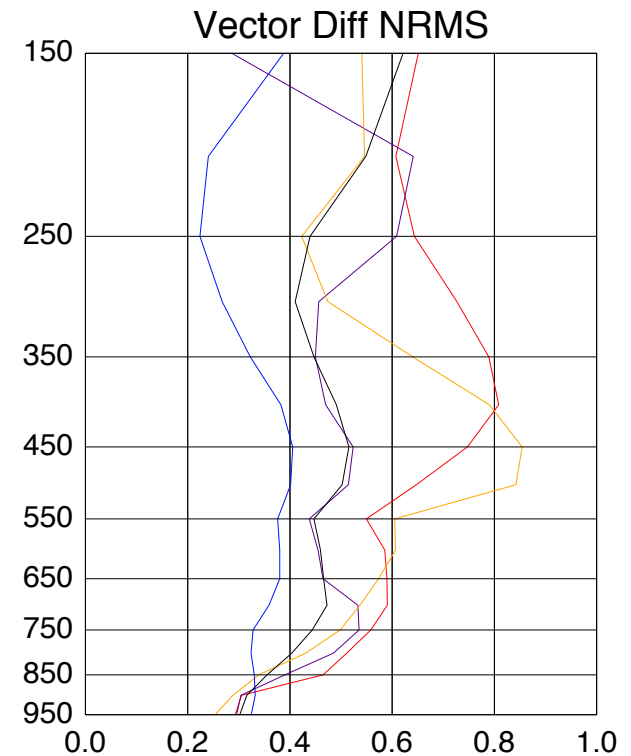
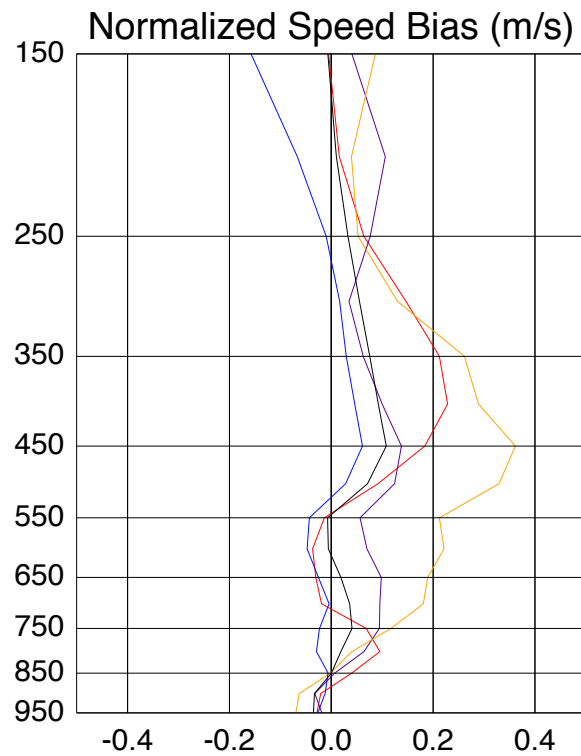
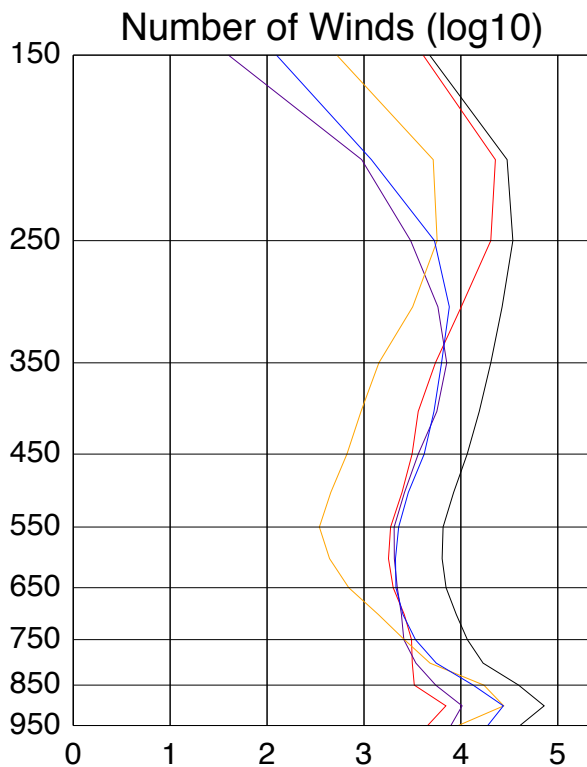
All Data – Black

Tropics ITCZ – Red (0-20N)

Tropics – Yellow (20S-0)

Southern Hemisphere – Blue (60S-20S)

Northern Hemisphere – Purple (20N-60N)



All proxy GOES-R ABI AVMs included – no quality control has been applied

Quality Control Parameters

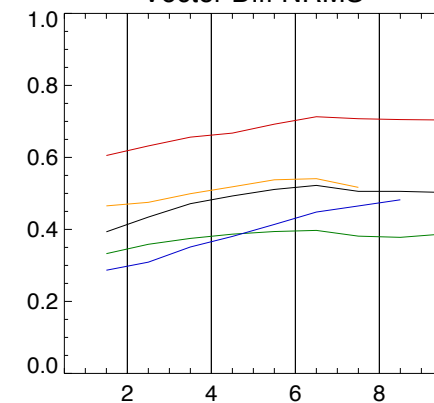
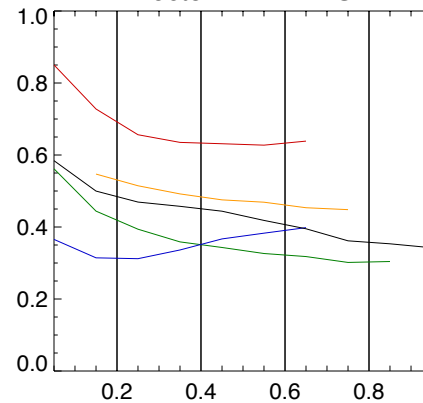
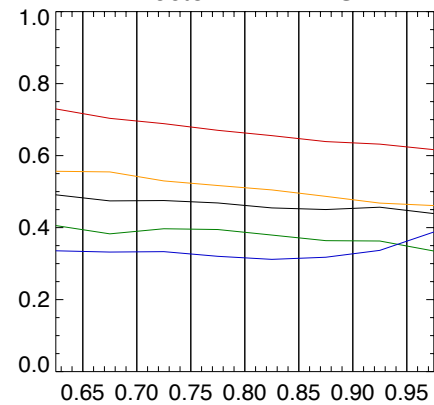
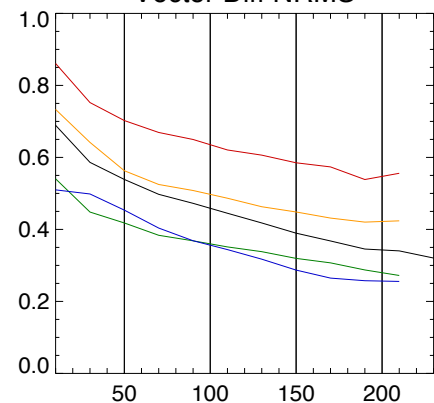
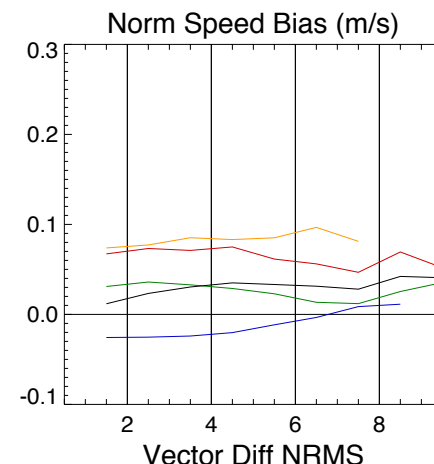
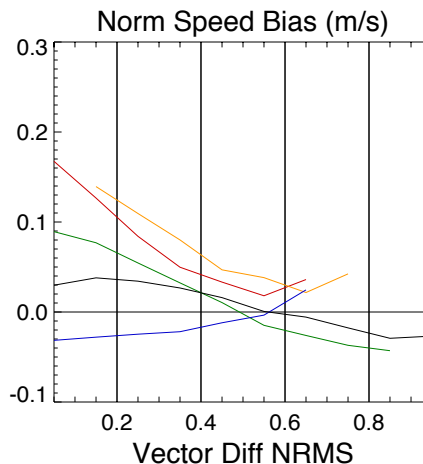
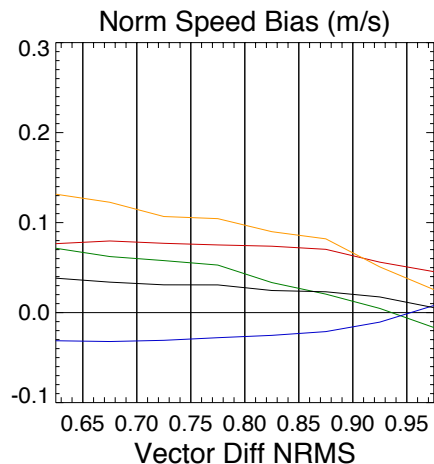
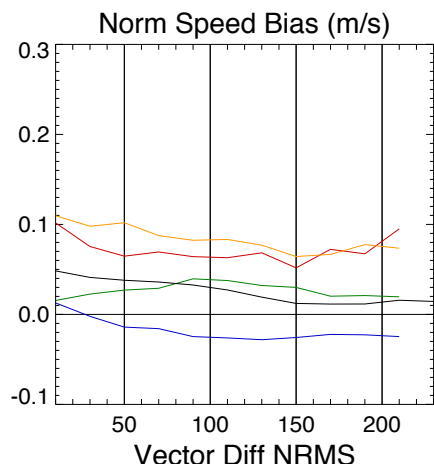
- **Traditional metrics:** QI and its components & EE
- **Algorithm parameters:** cluster sample size, standard deviation, correlation as well as how many clusters were found in the target box
- **Atmospheric conditions:** temperature gradient and wind shear $\pm 200\text{mb}$ layer around AMV

Cluster Size

Correlation

Standard Dev

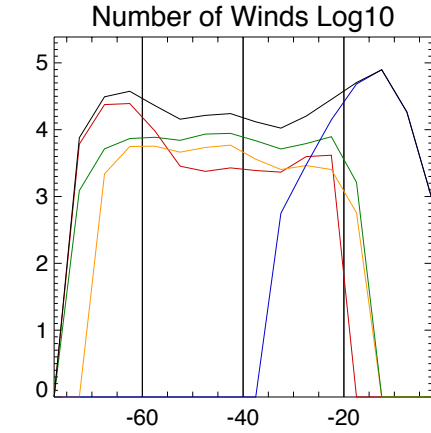
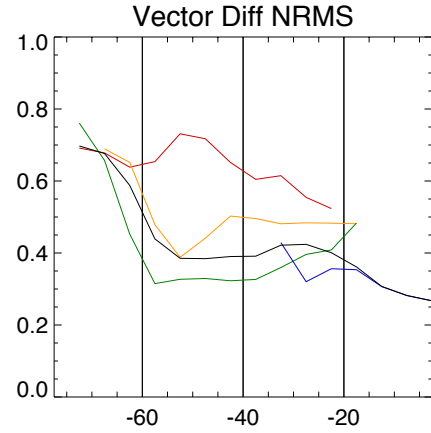
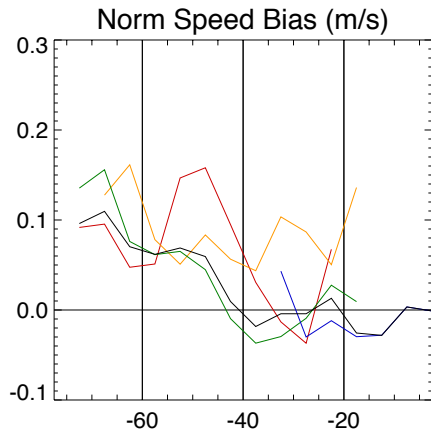
Number of Clusters



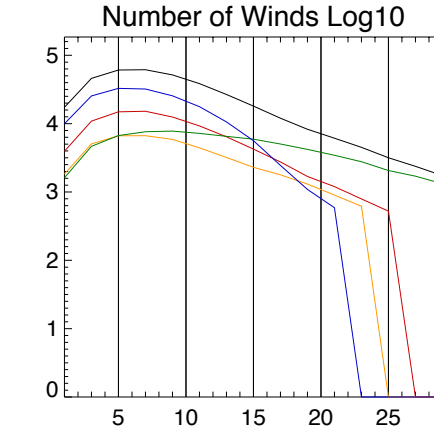
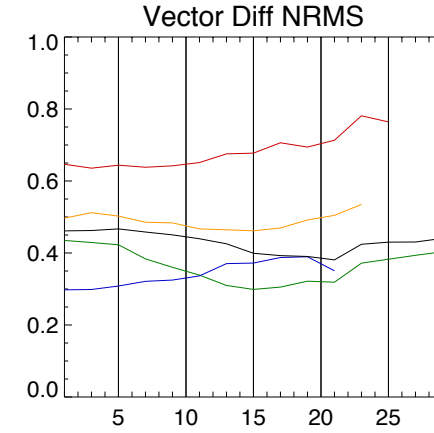
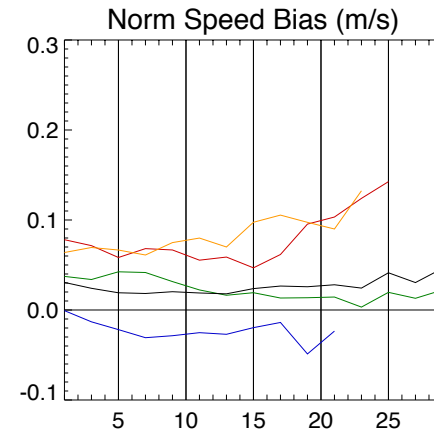
OMB normalized speed bias and vector difference NRMS for the Nested Tracking Algorithm first vector parameters. Second vector parameters have similar behavior.

All Data – Black
Below 800mb – Blue (60S-60N)
Mid-Upper Level AMVs above 800mb:
Tropics ITCZ – Red (0-20N)
Southern Hemisphere – Green (60S-0)
Northern Hemisphere – Yellow (20N-60N)

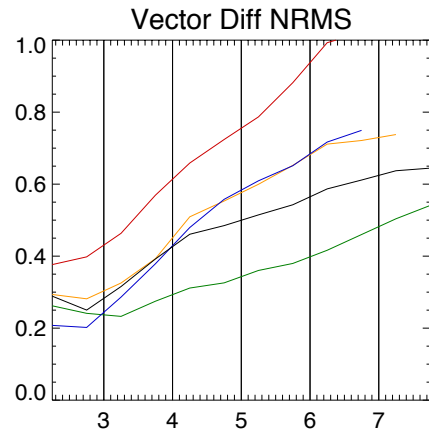
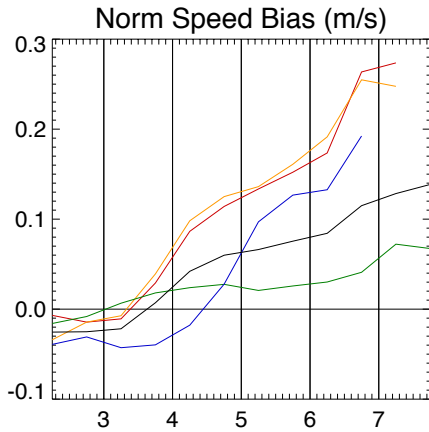
Temperature Gradient



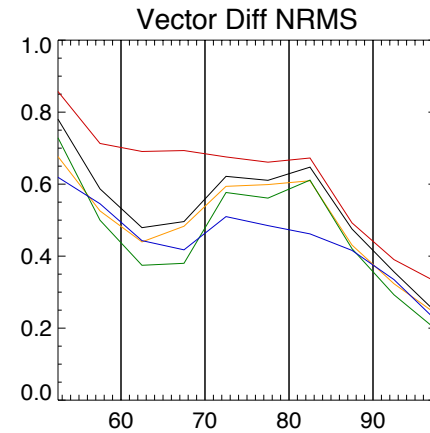
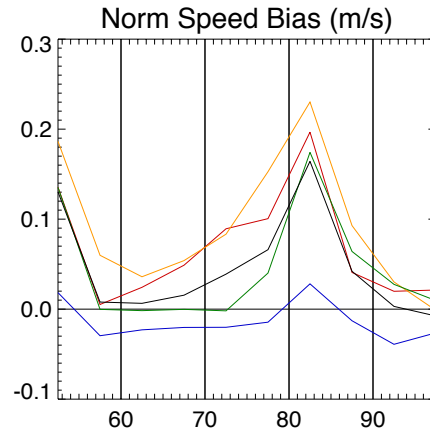
Wind Shear



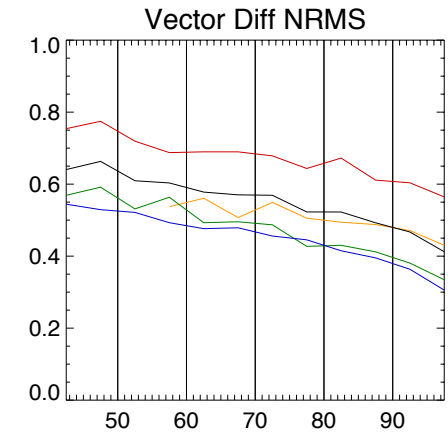
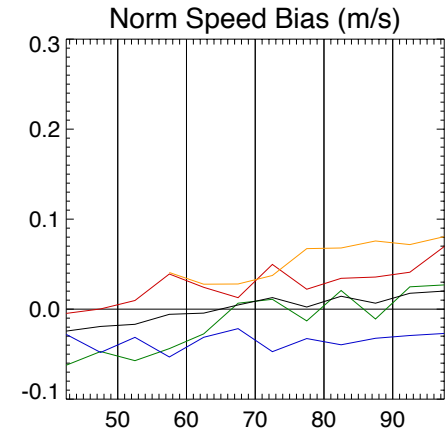
Expected Error



Quality Indicator QI



Local Consistency QI6

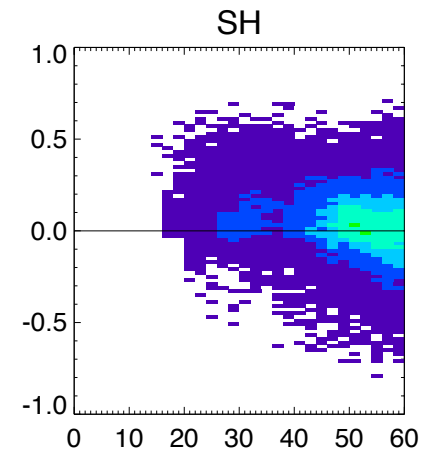
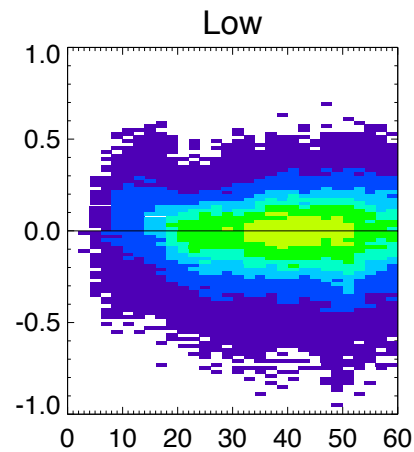
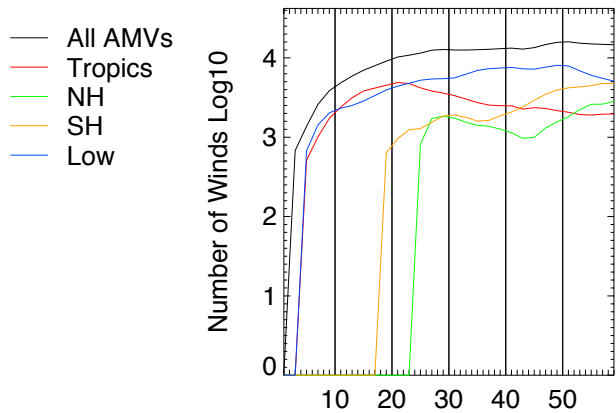
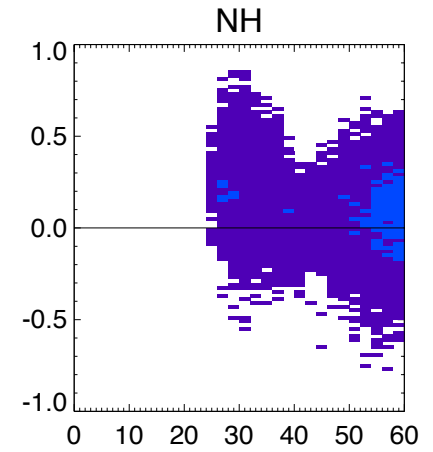
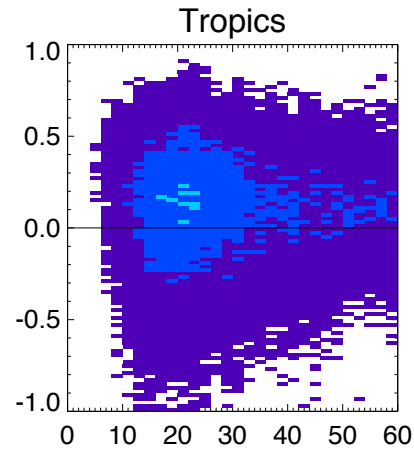
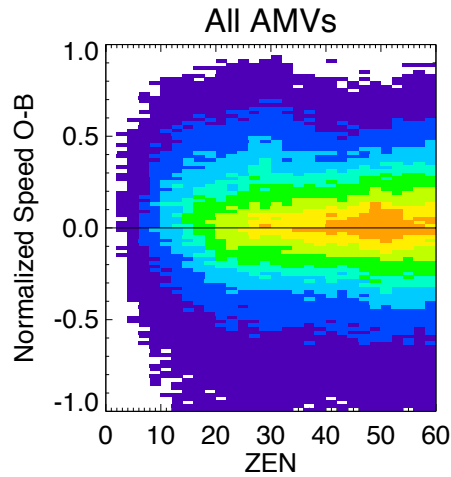


Future Work

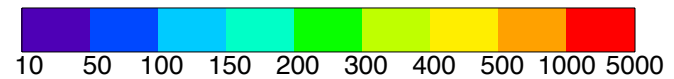
- Complete a GFS run to obtain O-B stats for a different season with all ABI channels included
- Calculate O-B statistics for the new run and reevaluate the possible quality control parameters
- Select candidate QC metrics
- Complete 2 seasonal GFS runs with AMV assimilation
- Evaluate Obs-Analysis

ZEN - Zenith Angle vs Normalized Speed O-B

Number Distribution of AMV - GFS Background



GOES-R AMV July 25 - Aug 2, 2011 using Channel 14 data (11 Micron)

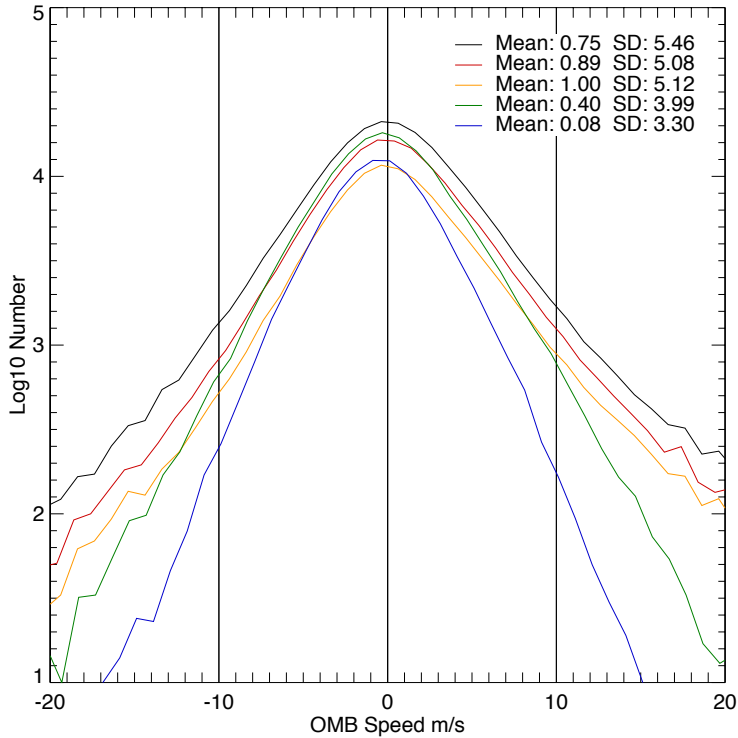


Applying QC to Speed O-B

- Black – No QC
- Red – QI > 60
- Yellow – QI > 80
- Green – EE < 5
- Blue – EE < 4

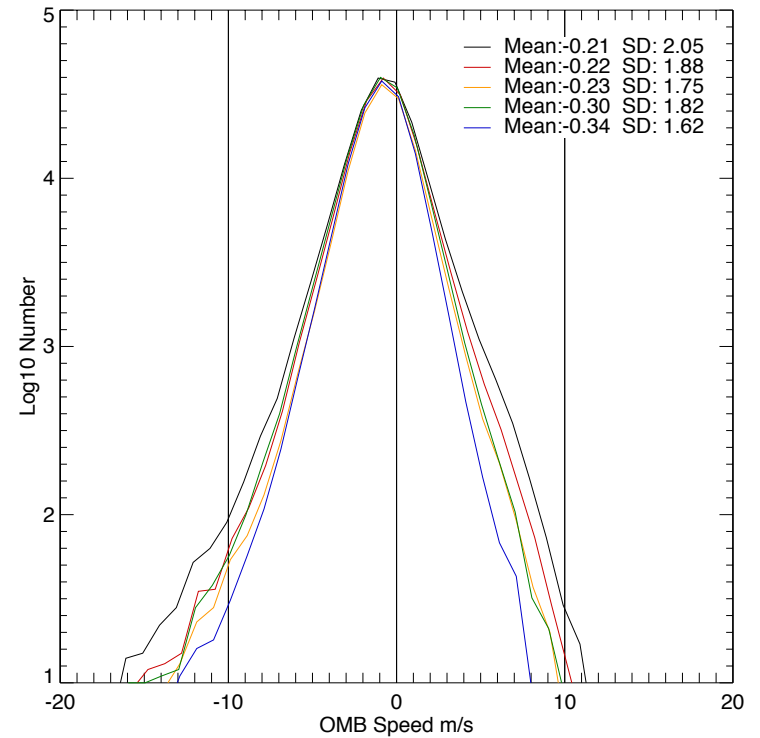
Above 800mb

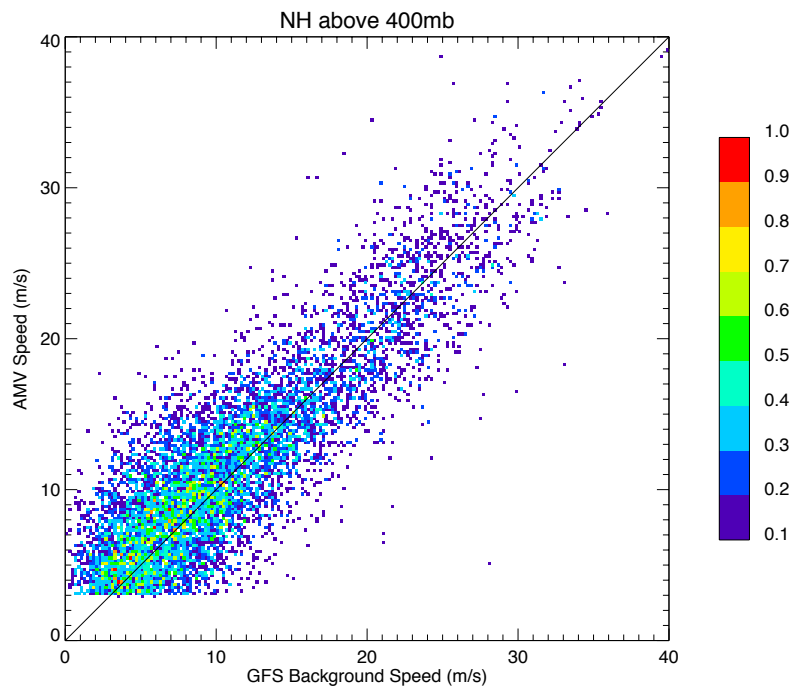
Number Distribution for Speed Observation-Background



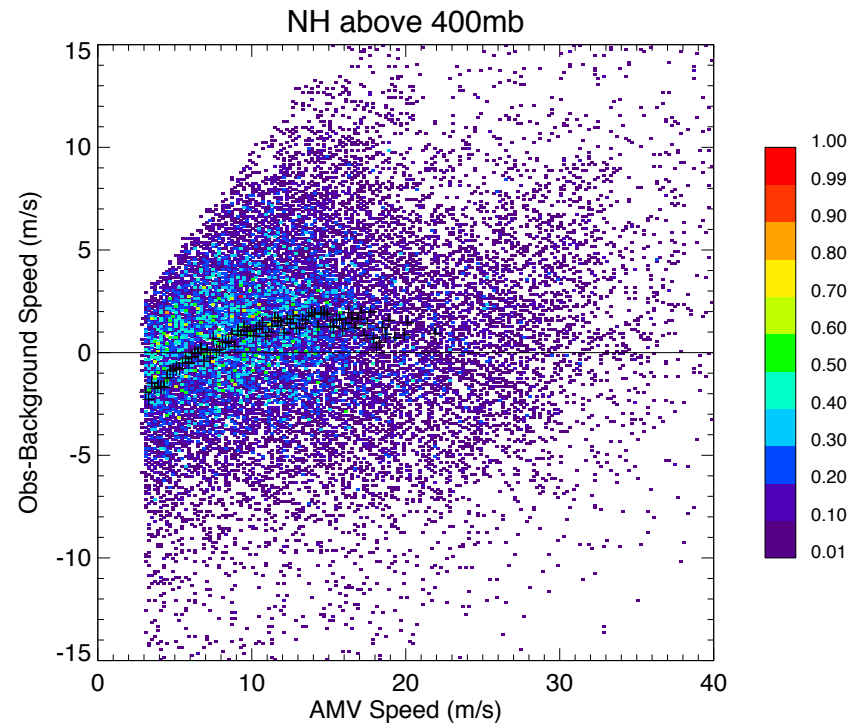
Below 800mb

Number Distribution for Speed Observation-Background

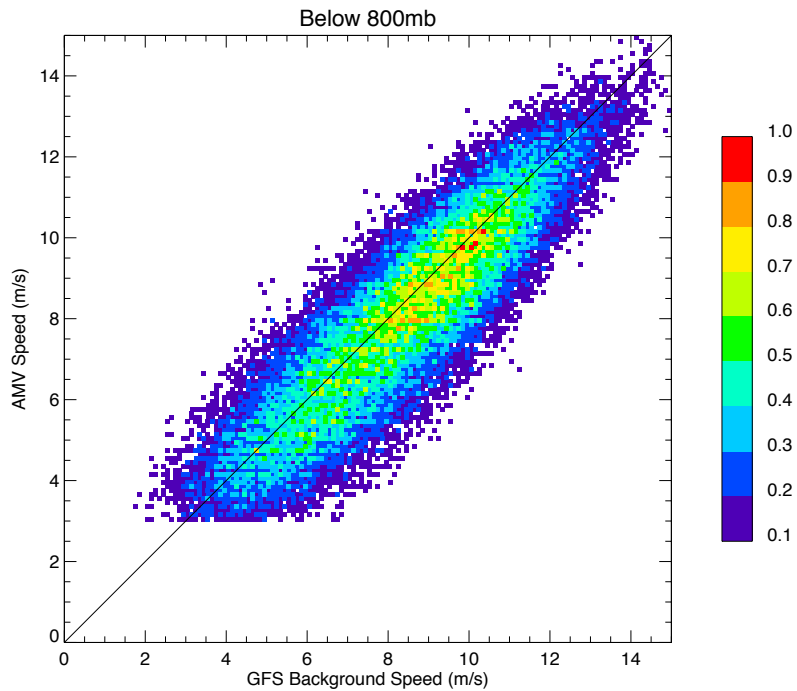




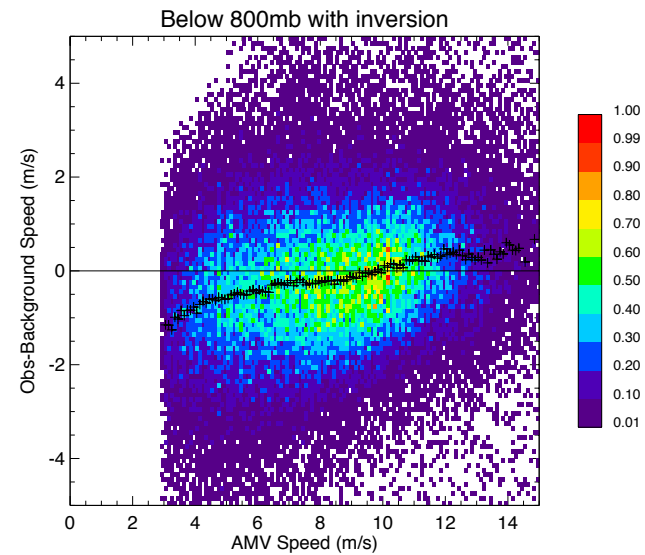
Color shows number of AMVs in the bin scaled to a maximum of 1



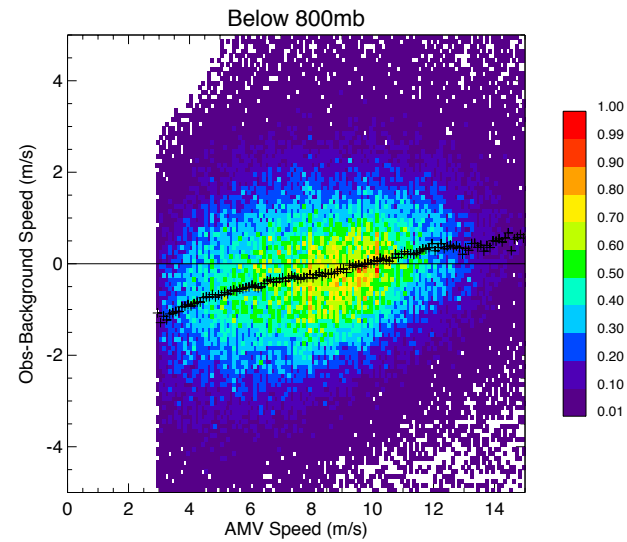
Color shows number of AMVs in the bin scaled to a maximum of 1
+ indicates the mean value for a given x-axis value



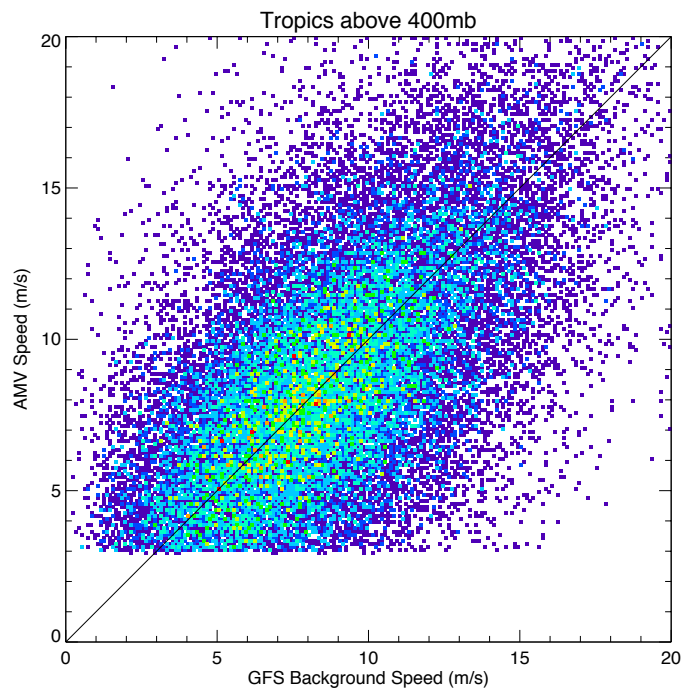
Color shows number of AMVs in the bin scaled to a maximum of 1



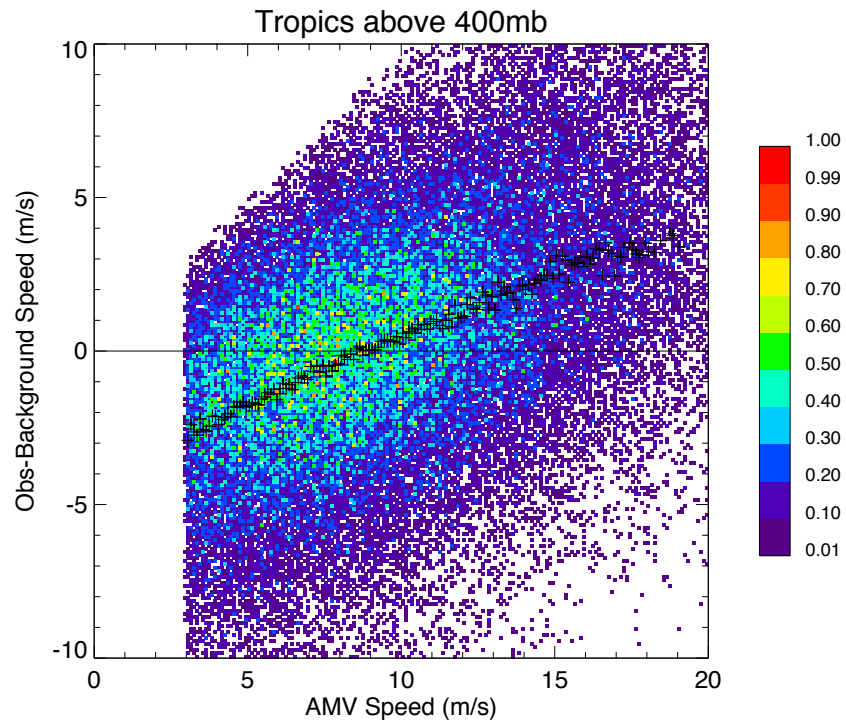
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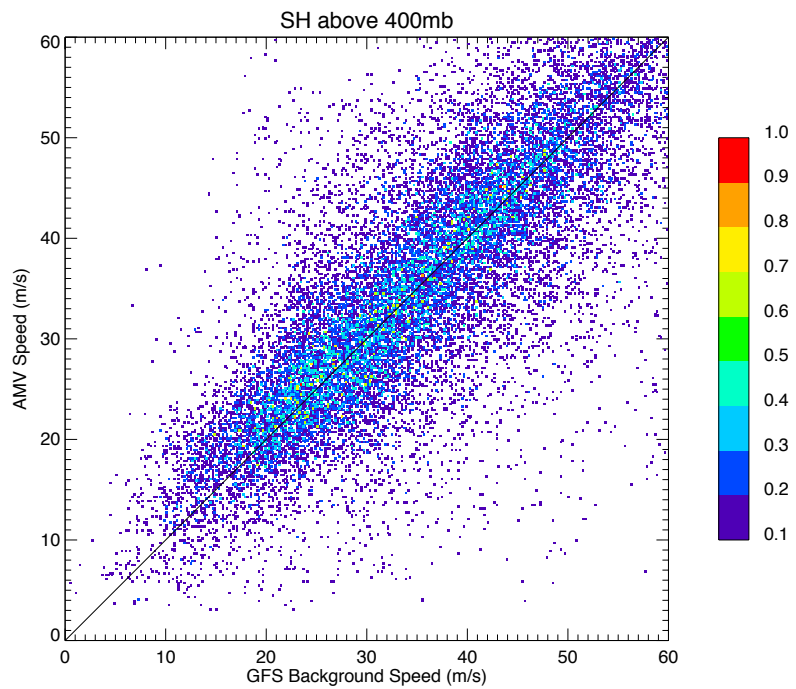
Color shows number of AMVs in the bin scaled to a maximum of 1
+ indicates the mean value for a given x-axis value



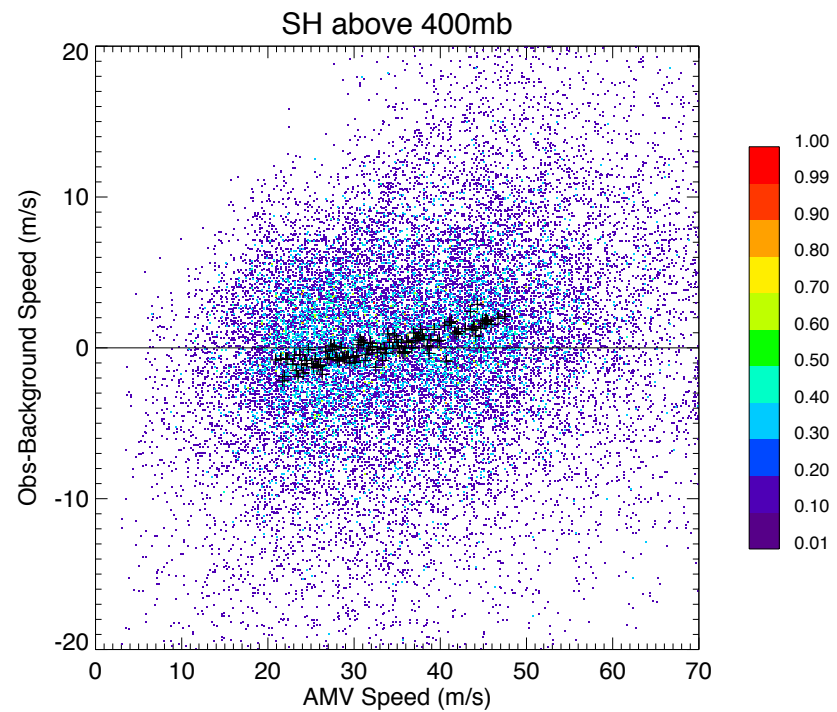
Color shows number of AMVs in the bin scaled to a maximum of 1



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