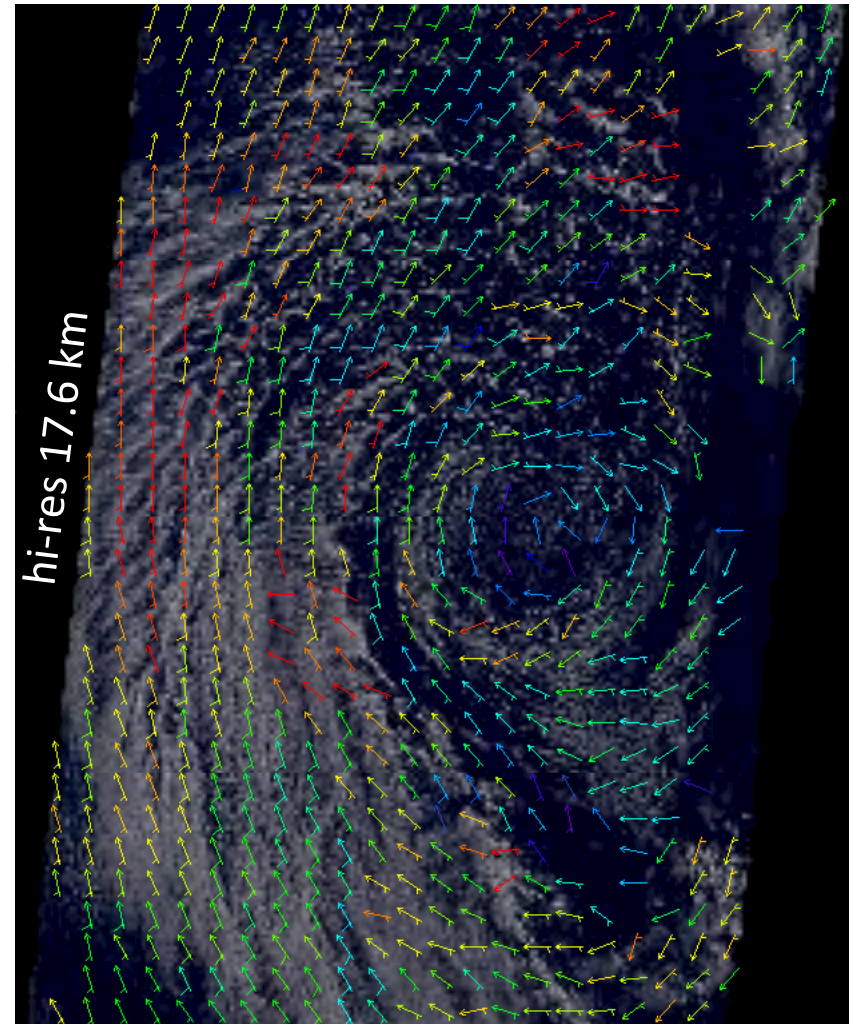
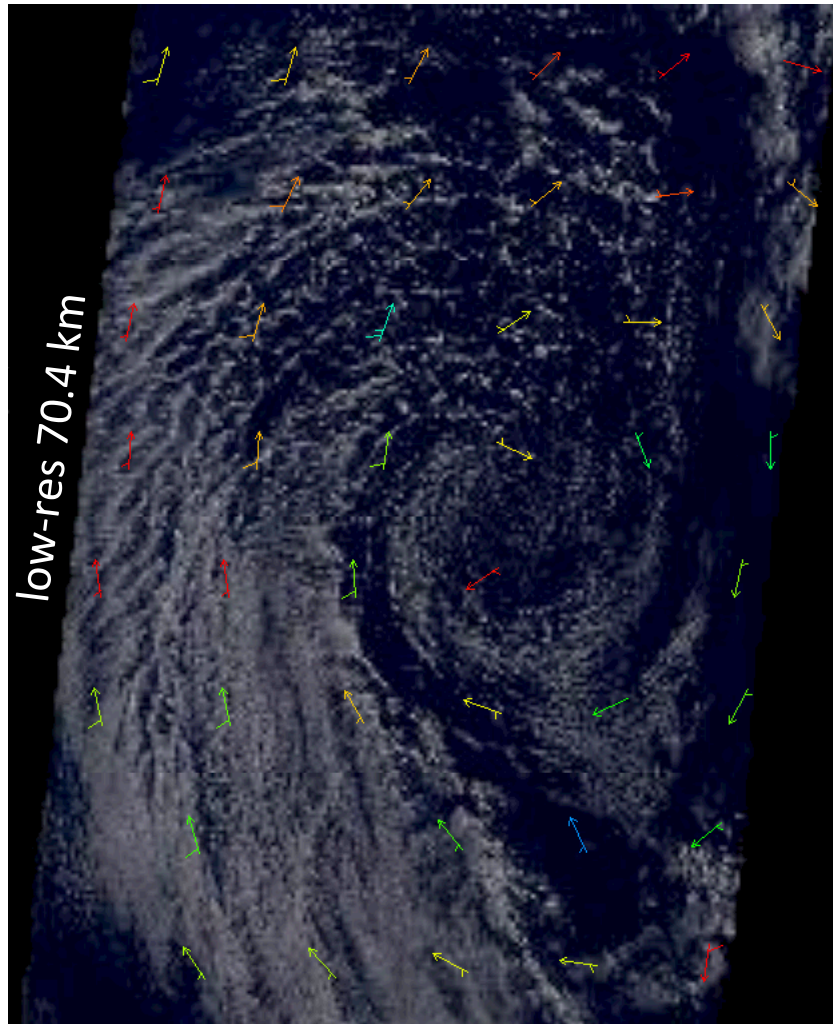


Evaluation of Upgraded MISR Stereo Motion Vectors

Ákos Horváth ■ Leibniz Institute for Tropospheric Research, Leipzig, Germany



MISR SMV – Meteosat-9 CMV Comparison at IWW10

MISR Stereo Motion Vectors

- TC_STEREO v. F99_198
- Paths 150 – 230
- Wind quality ≥ 3

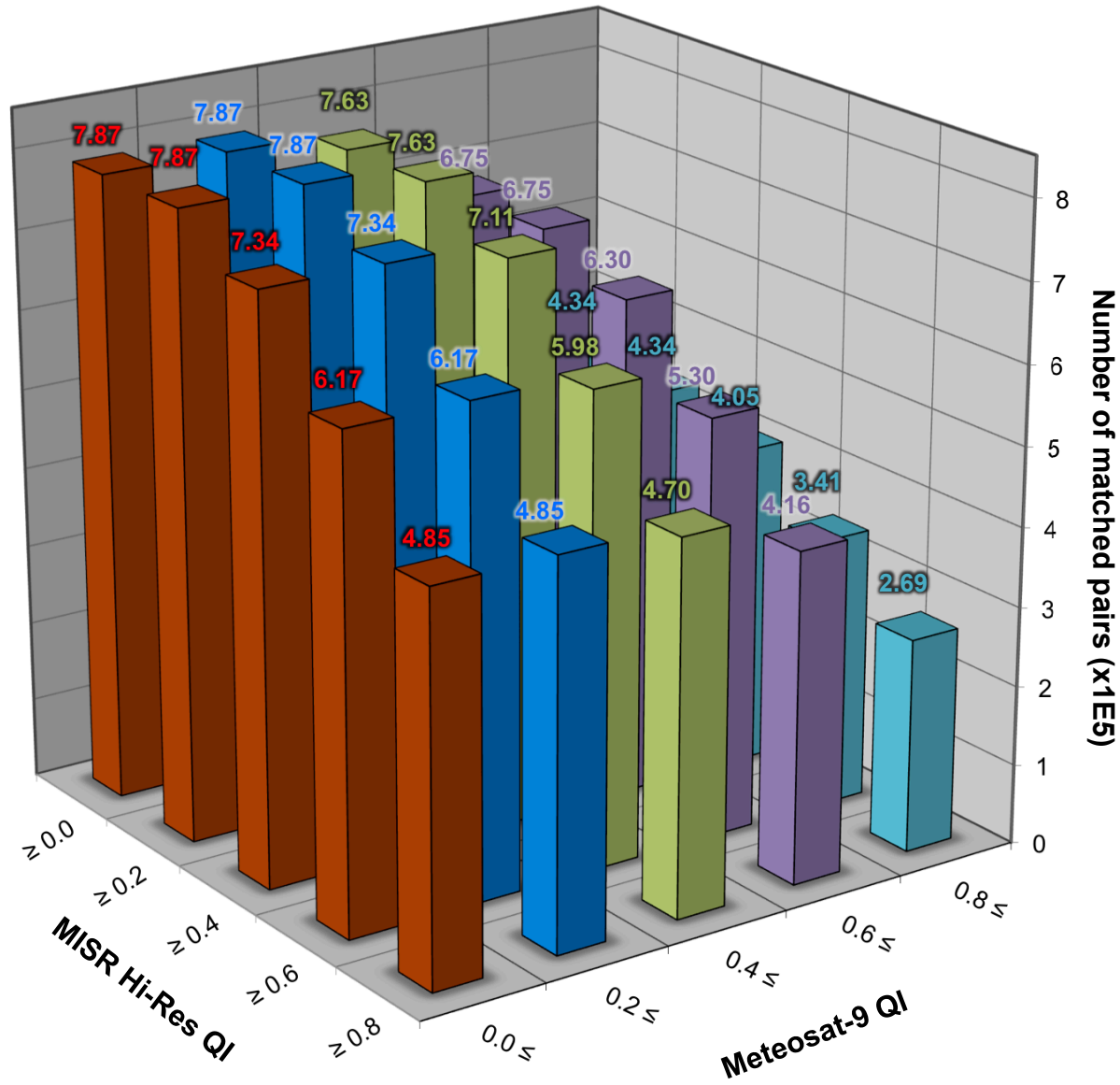
MSG2 Cloud Motion Vectors

- Visible & infrared CMVs
- Quality Indicator without first guess ≥ 80

- 1 year of data (2008)
- Dlat and Dlon $\leq 0.5^\circ$
- Dtime ≤ 15 min
- Closest in height
- 225,155 wind pairs
- 70.4-km MISR SMVs

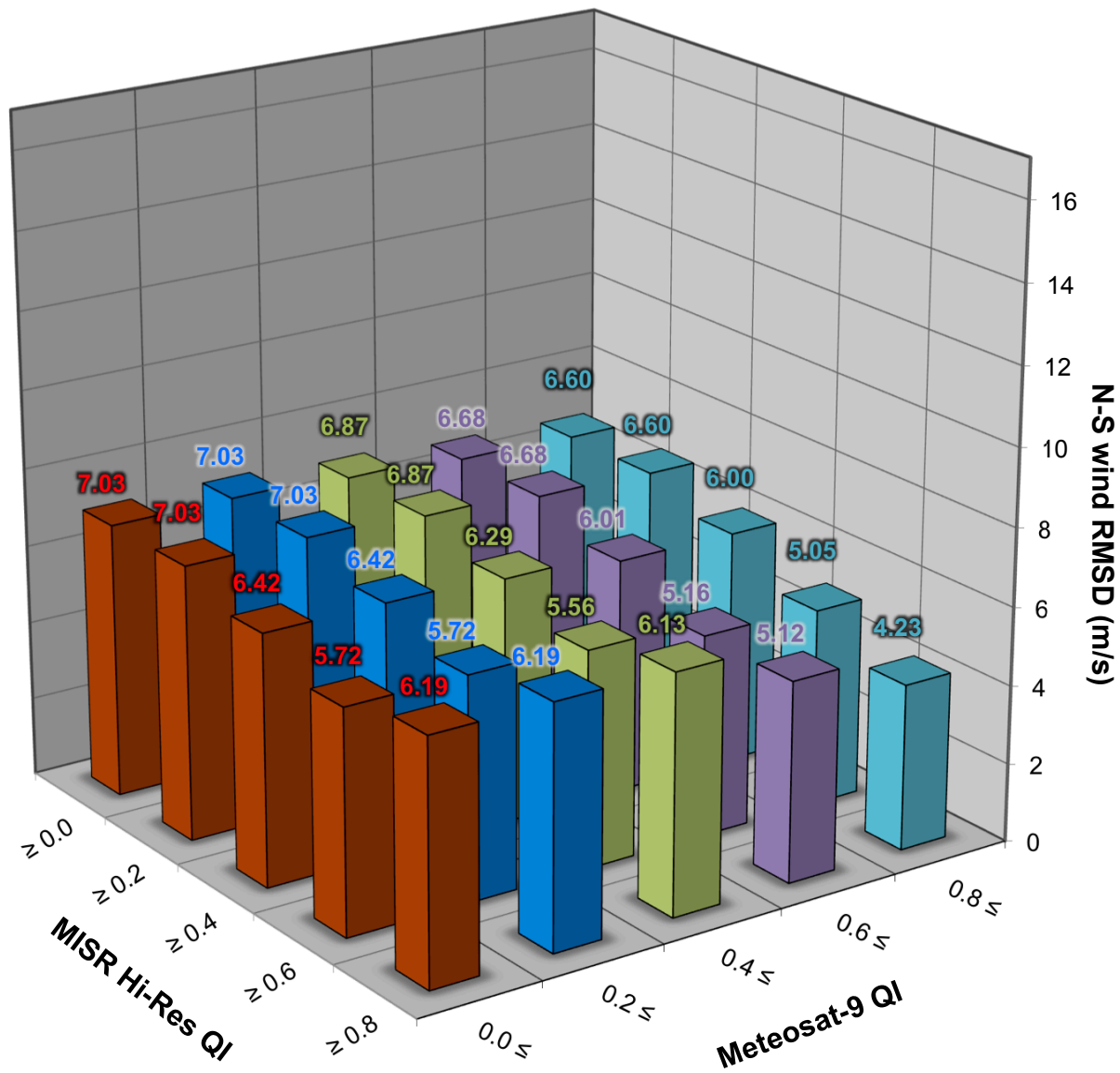
Dependence on QI – Number of Matches

MISR Hi-Res Quality vs. Meteosat-9

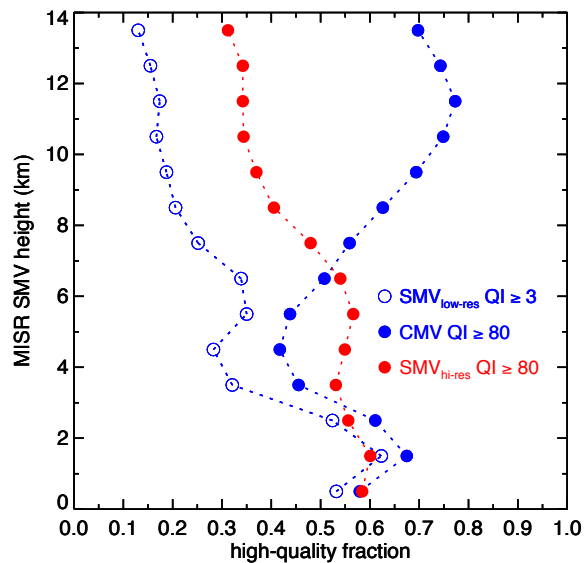
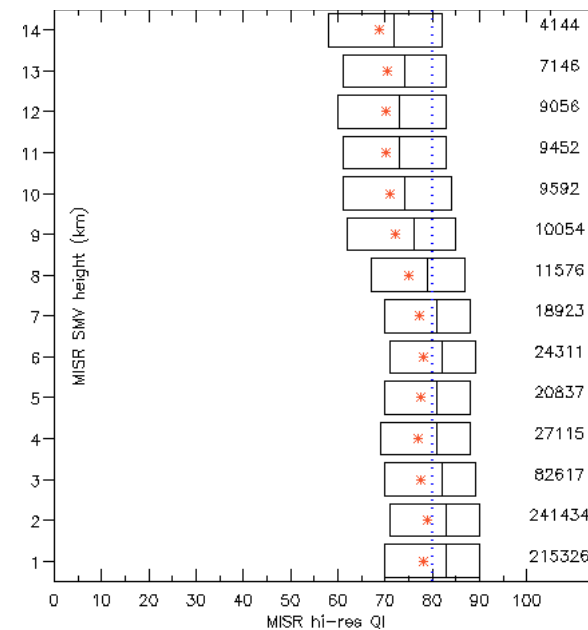
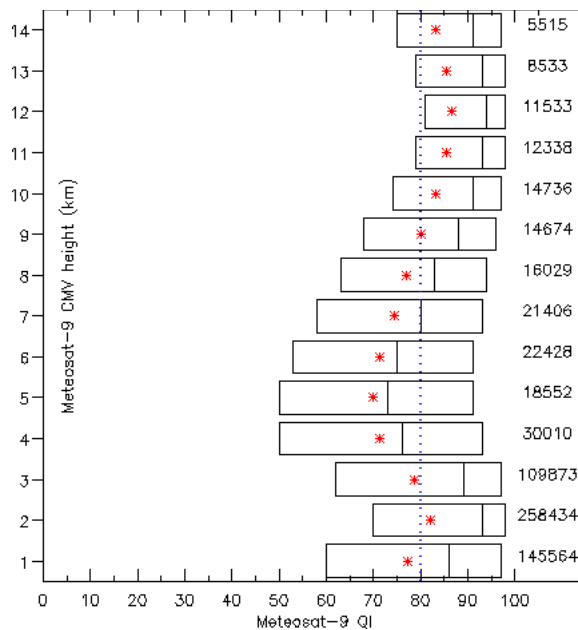
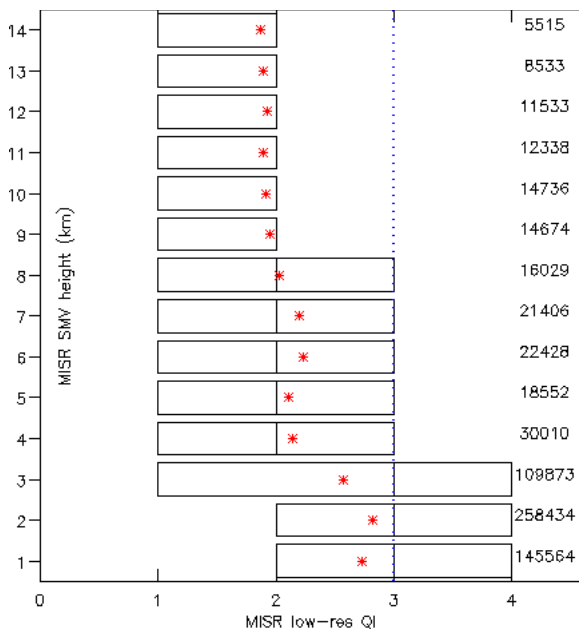


Dependence on QI – N-S Wind RMSD

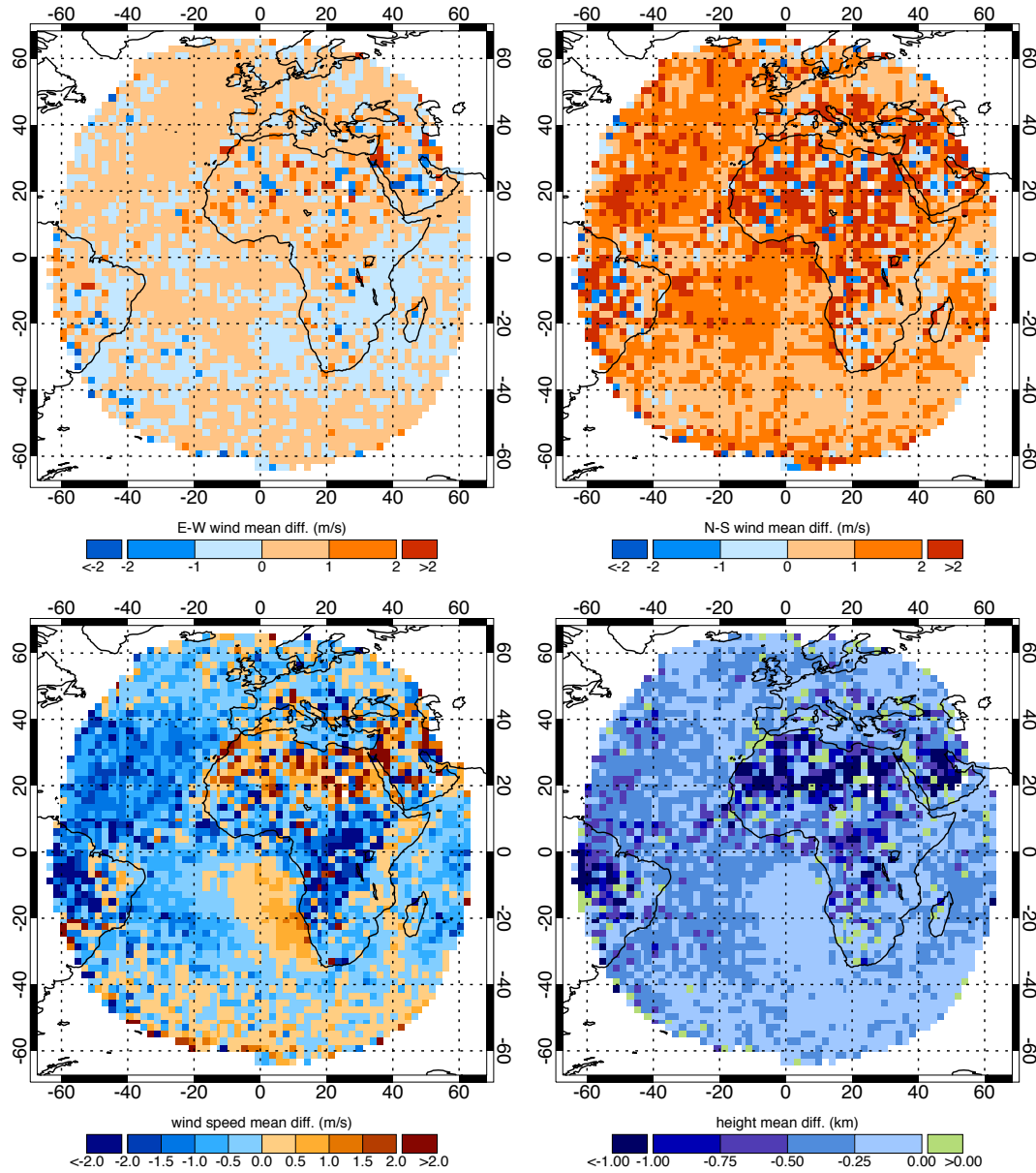
MISR Hi-Res QI vs. N-S Wind RMSD vs. Meteosat-9 QI



Vertical Variation of QI



Hi-res – Low-res MISR SMV Differences

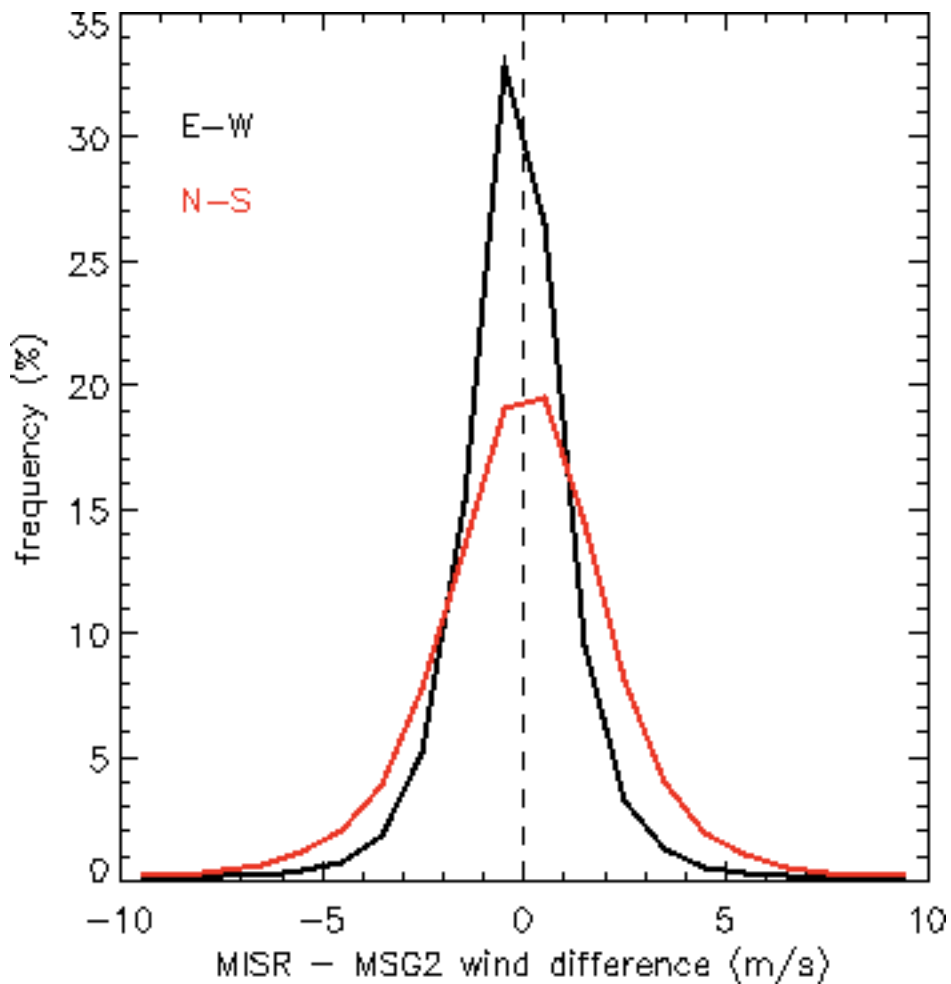


SMV-CMV Comparison – Global Mean Statistics

E-W bias	low-res	hi-res
all	-0.42	-0.34
ocean	-0.39	-0.32
land	-0.70	-0.57

E-W rmsd	low-res	hi-res
all	2.50	2.77
ocean	2.43	2.72
land	3.03	3.13

E-W corr	low-res	hi-res
all	0.97	0.96
ocean	0.97	0.96
land	0.95	0.95



N-S bias	low-res	hi-res
all	-1.12	-0.03
ocean	-1.05	0.04
land	-1.71	-0.62

N-S rmsd	low-res	hi-res
all	4.23	3.09
ocean	4.06	2.86
land	5.41	4.58

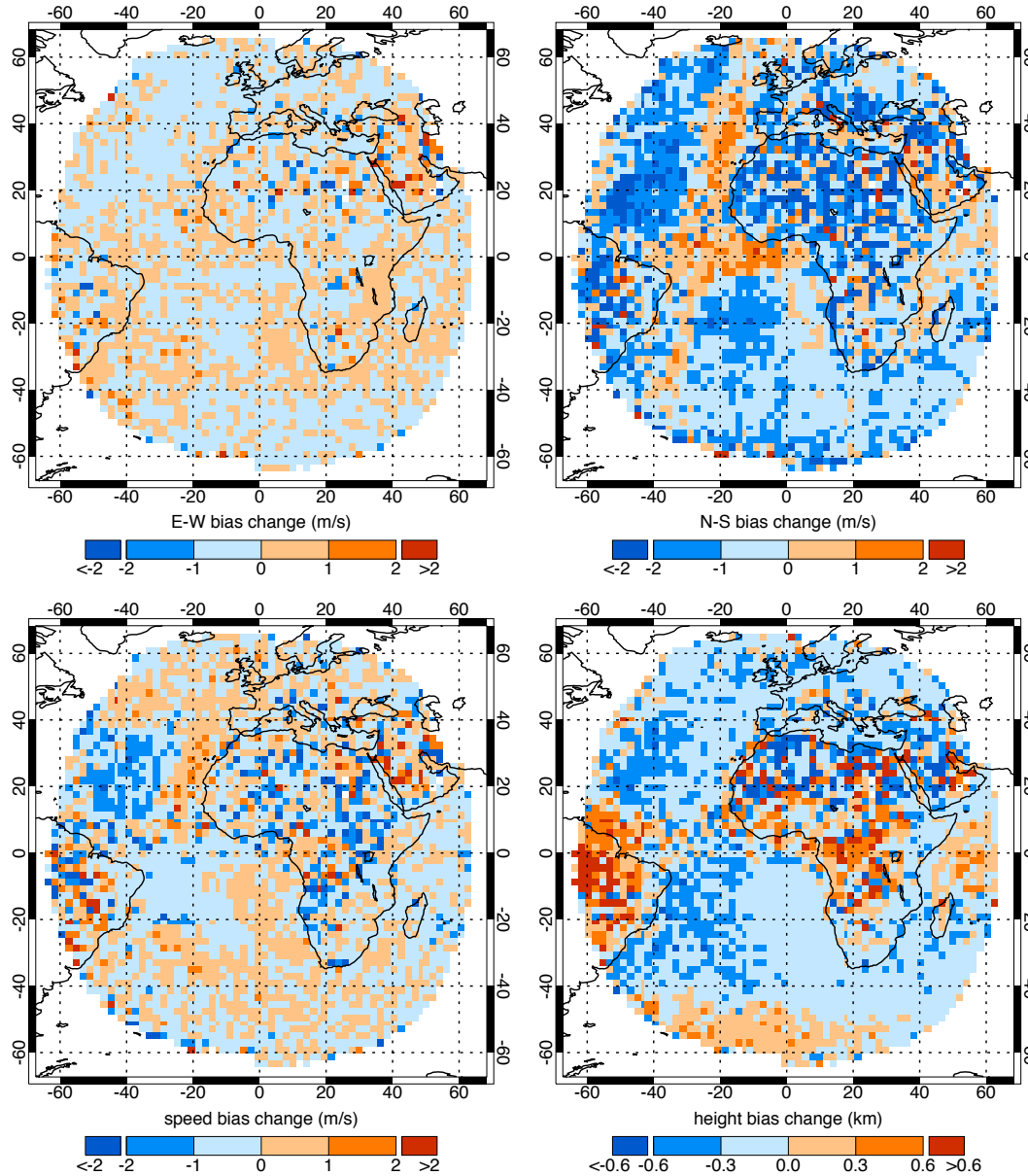
N-S corr	low-res	hi-res
all	0.84	0.89
ocean	0.85	0.91
land	0.74	0.78

low-res MISR

No significant change in E-W comparison, but *significant improvement in N-S comparison*

Change in SMV-CMV Mean Difference ('Bias')

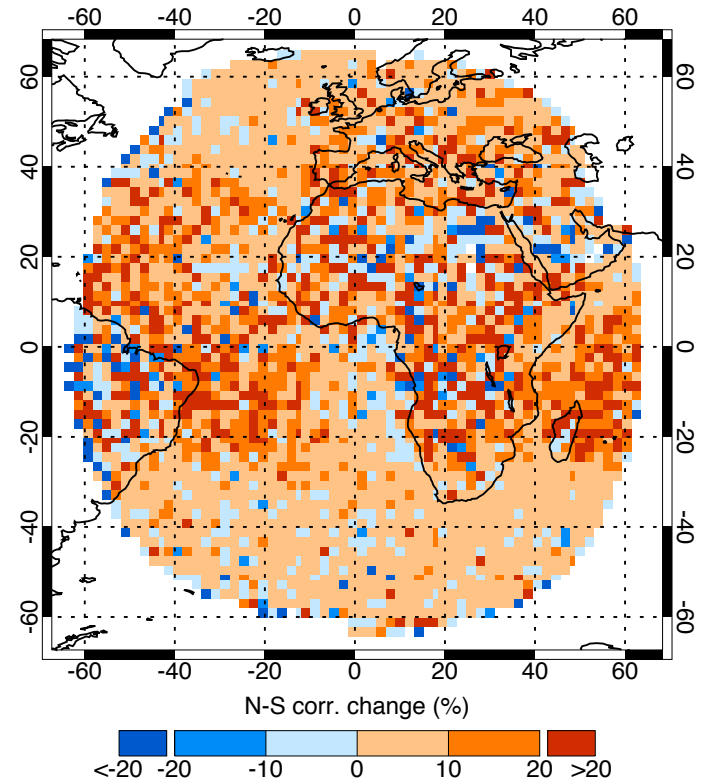
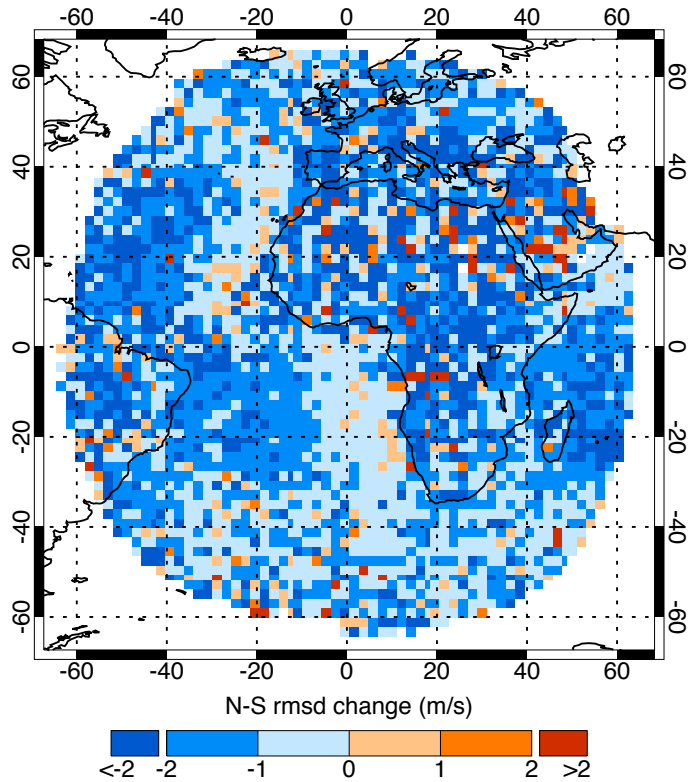
hi-res – low-res MISR



height bias	low-res	hi-res
all	443	188
ocean	453	209
land	358	12

Change in SMV-CMV N-S Wind RMSD and Correlation

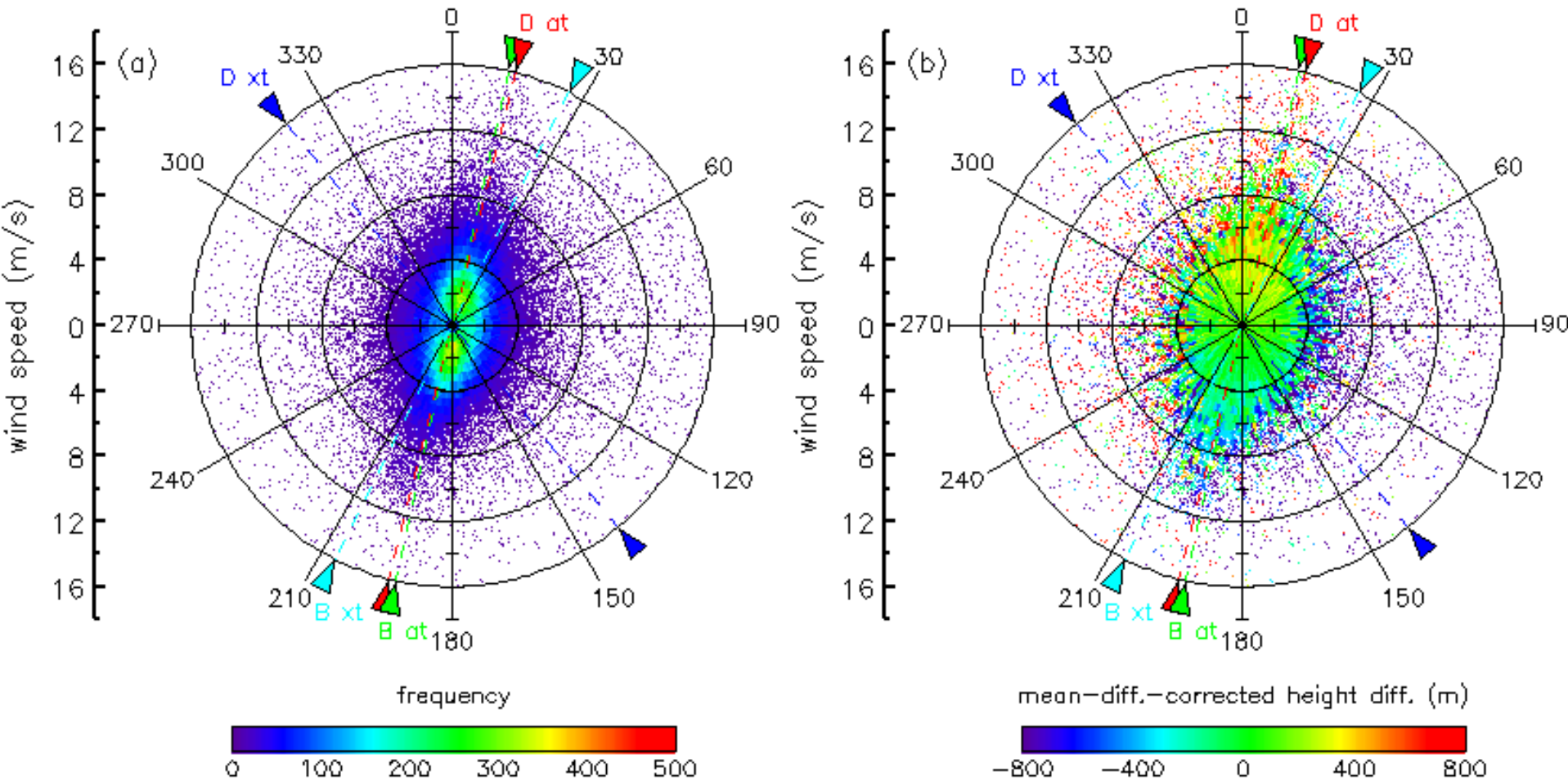
hi-res – low-res MISR



significant reduction in rmsd and increase in correlation

Distribution of SMV-CMV Vector Differences

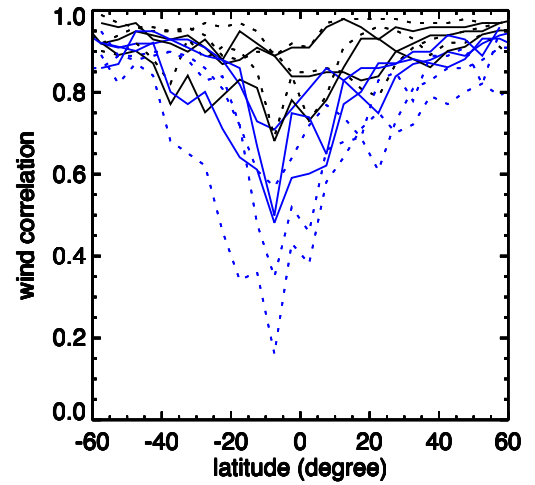
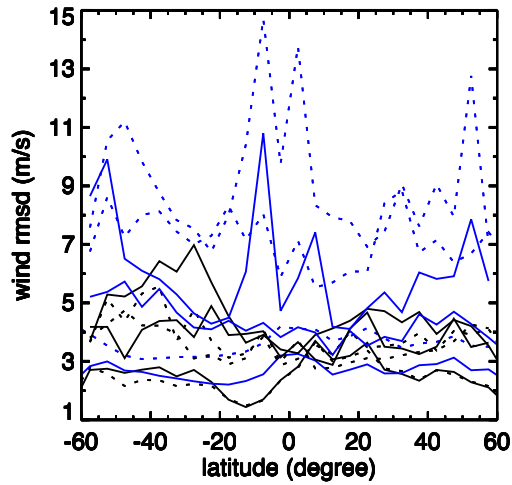
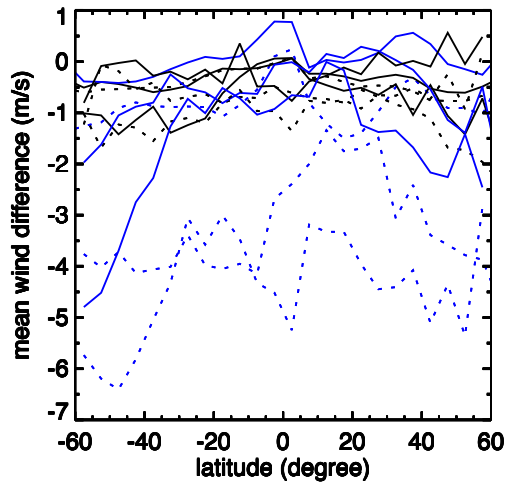
lowfreqMISSR



MISR N-SMISR N-S wind error height error is clearly visible

Meridional Variation of SMV-CMV Comparison

high level clouds ($\theta > 3$ km)

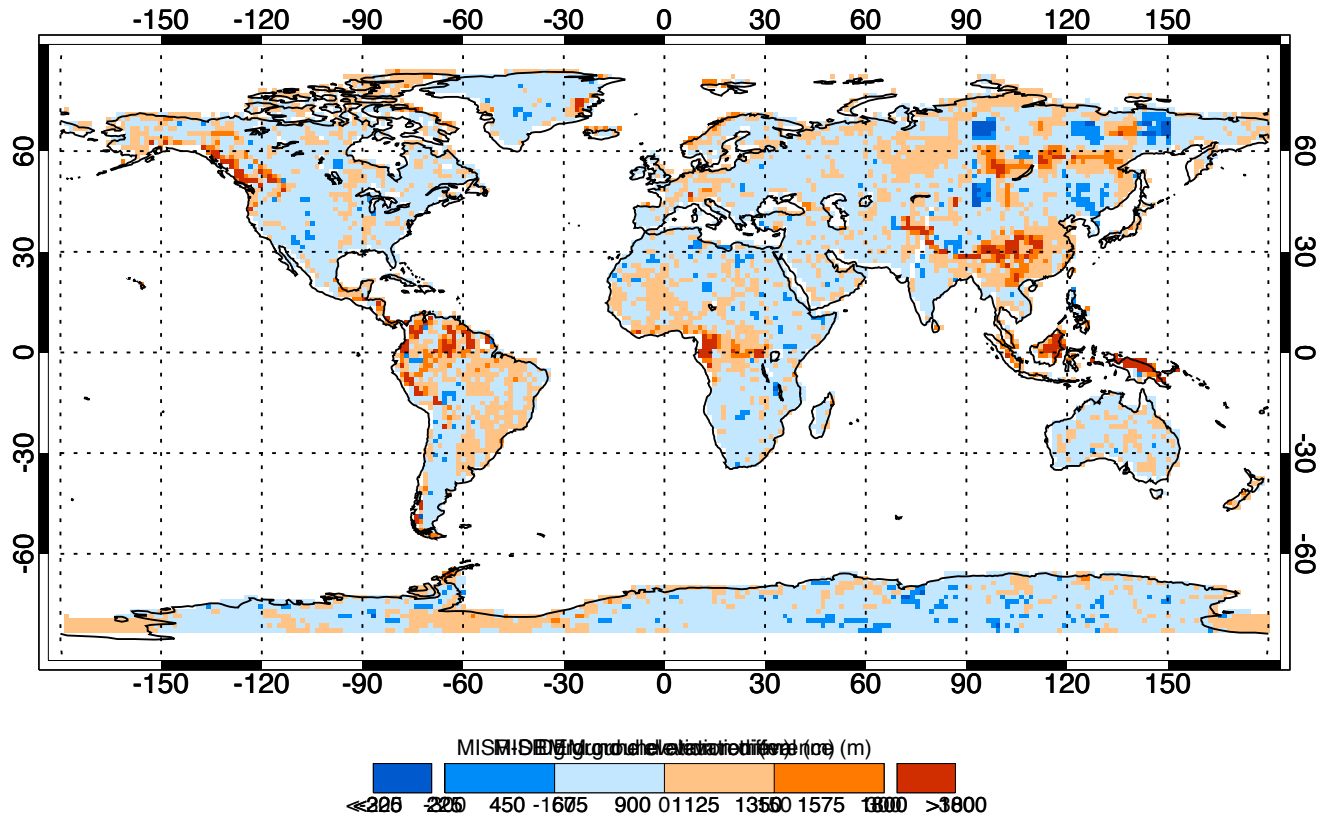


E-W N-S

..... low-res MISR — hi-res MISR

MISR Ground Retrievals – Surface Elevation

height bias = -19 m
height rmsd = 190 m

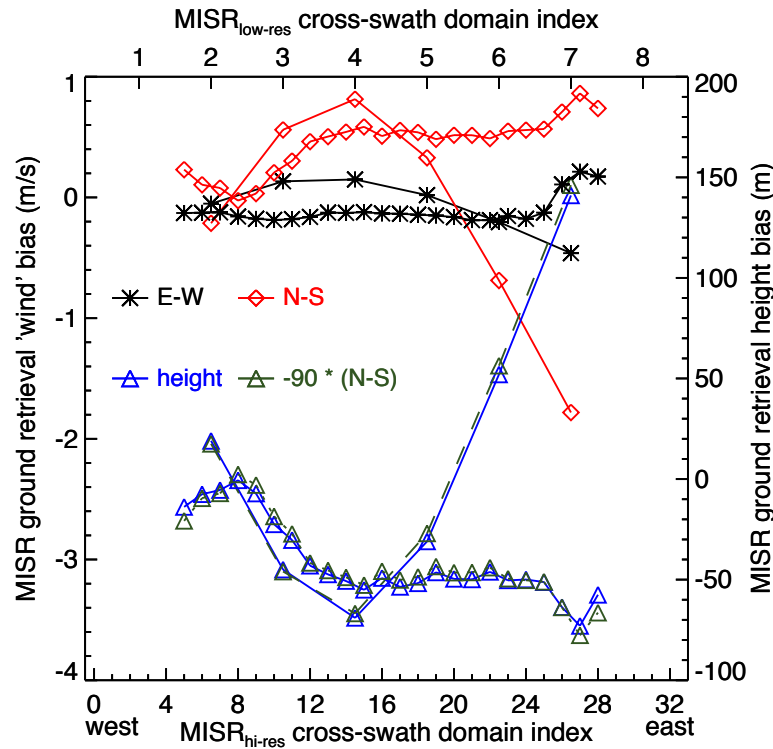


height bias = -19 m

height rmsd = 190 m

MISR Ground Retrievals – Cross-Swath Bias

low-res data



E-W_{low-res} bias = -0.106 m/s

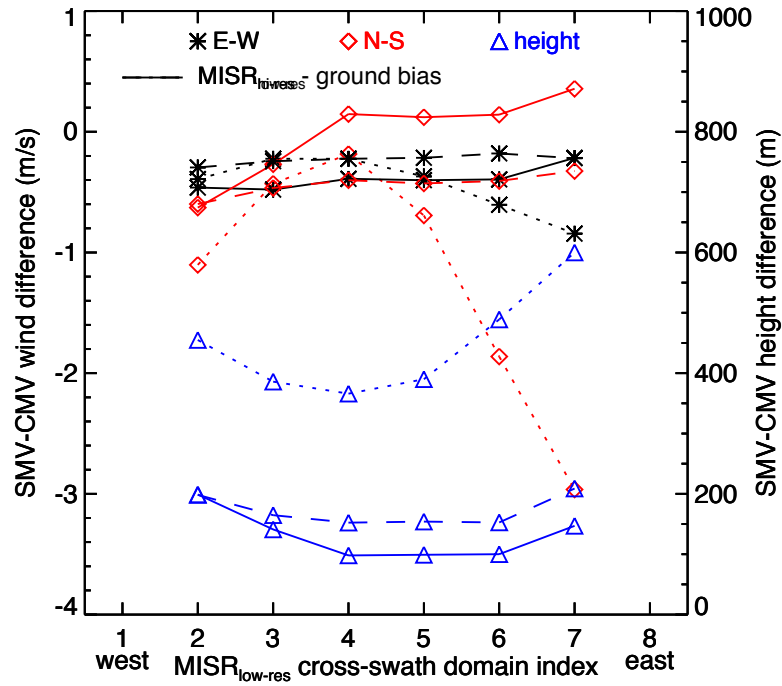
E-W_{low-res} slope = 0.670 m/s

N-S_{low-res} bias = +0.43 m/s

N-S_{low-res} slope = 11.795 m/s

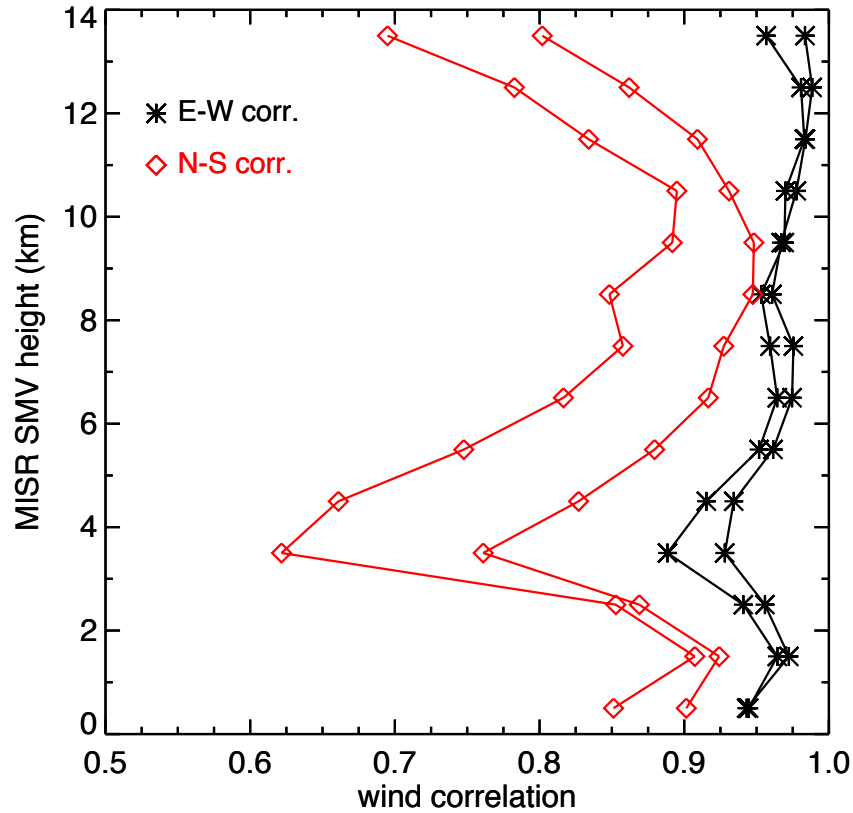
SMV-CMV Comparison – Cross-Swath Bias

hi-res MISR vs MISR
low-res MISR



SMV-CMV Comparison – Correlation Profiles

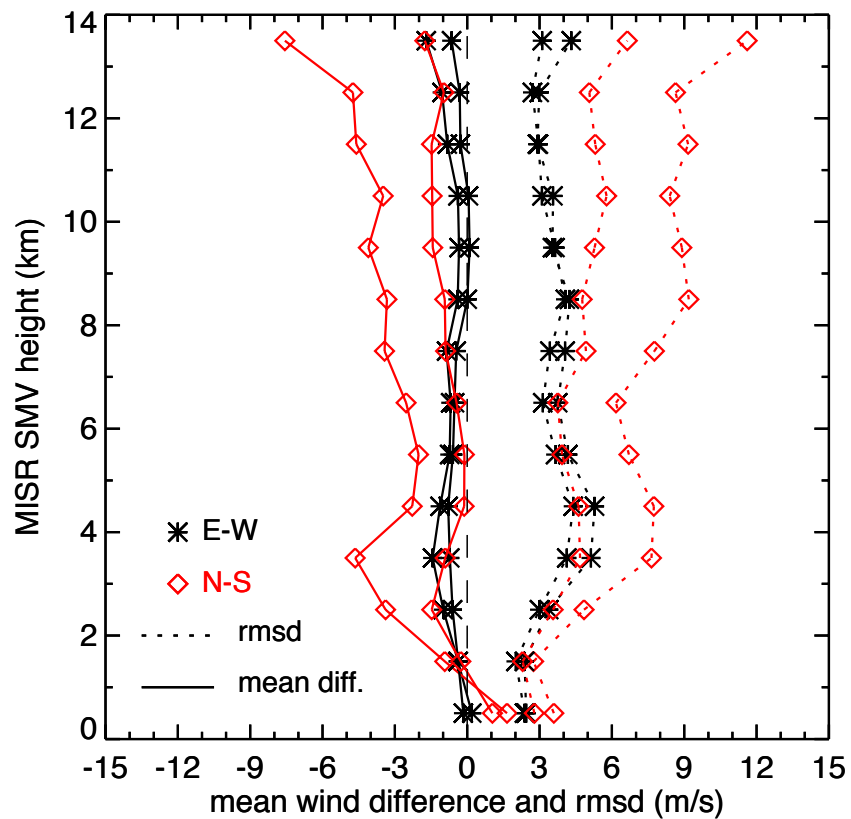
lowfreqMISSR



large increase in N-S wind correlation, slight decrease in E-W wind correlation

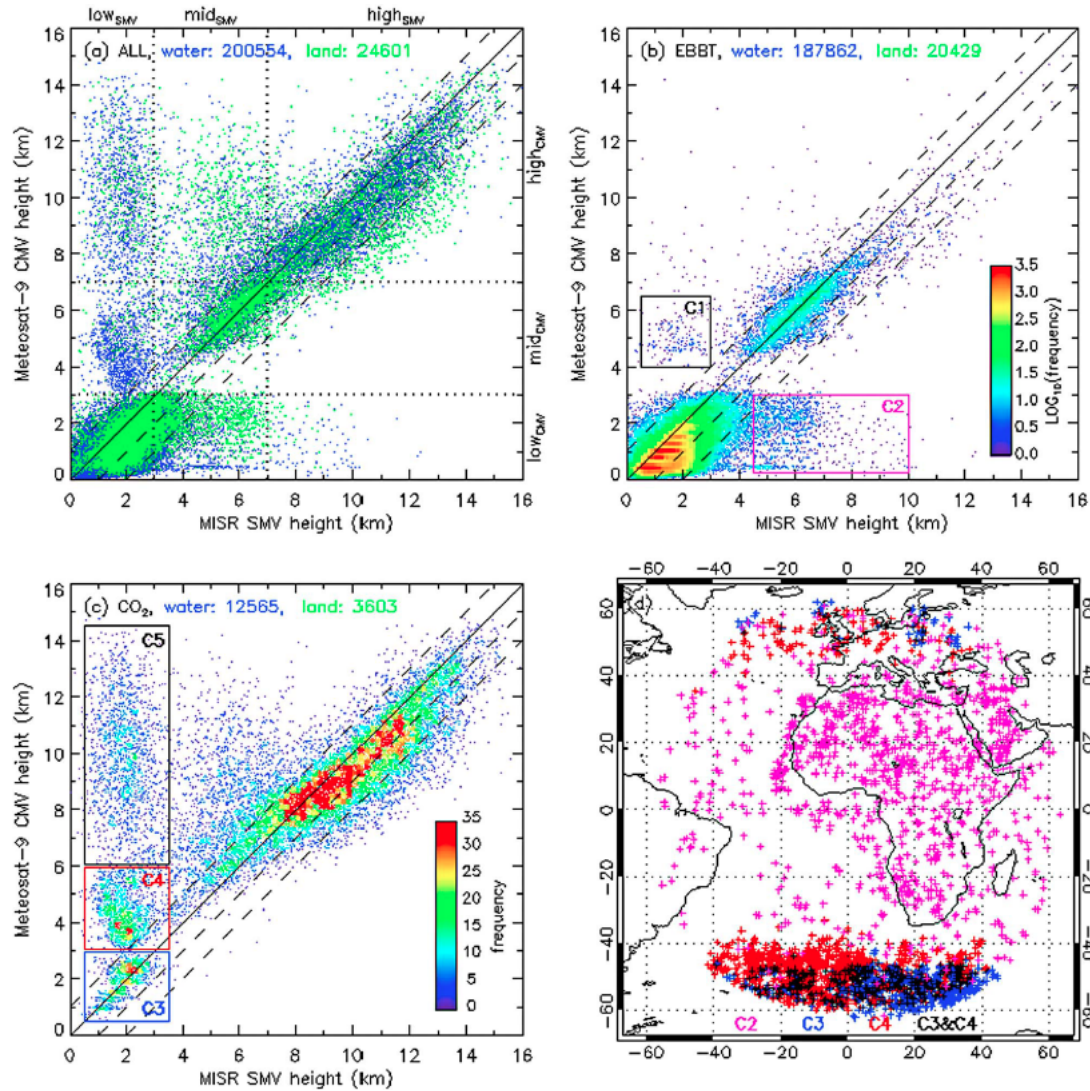
SMV-CMV Comparison – Bias and RMSD Profiles

lowfreqMISSR



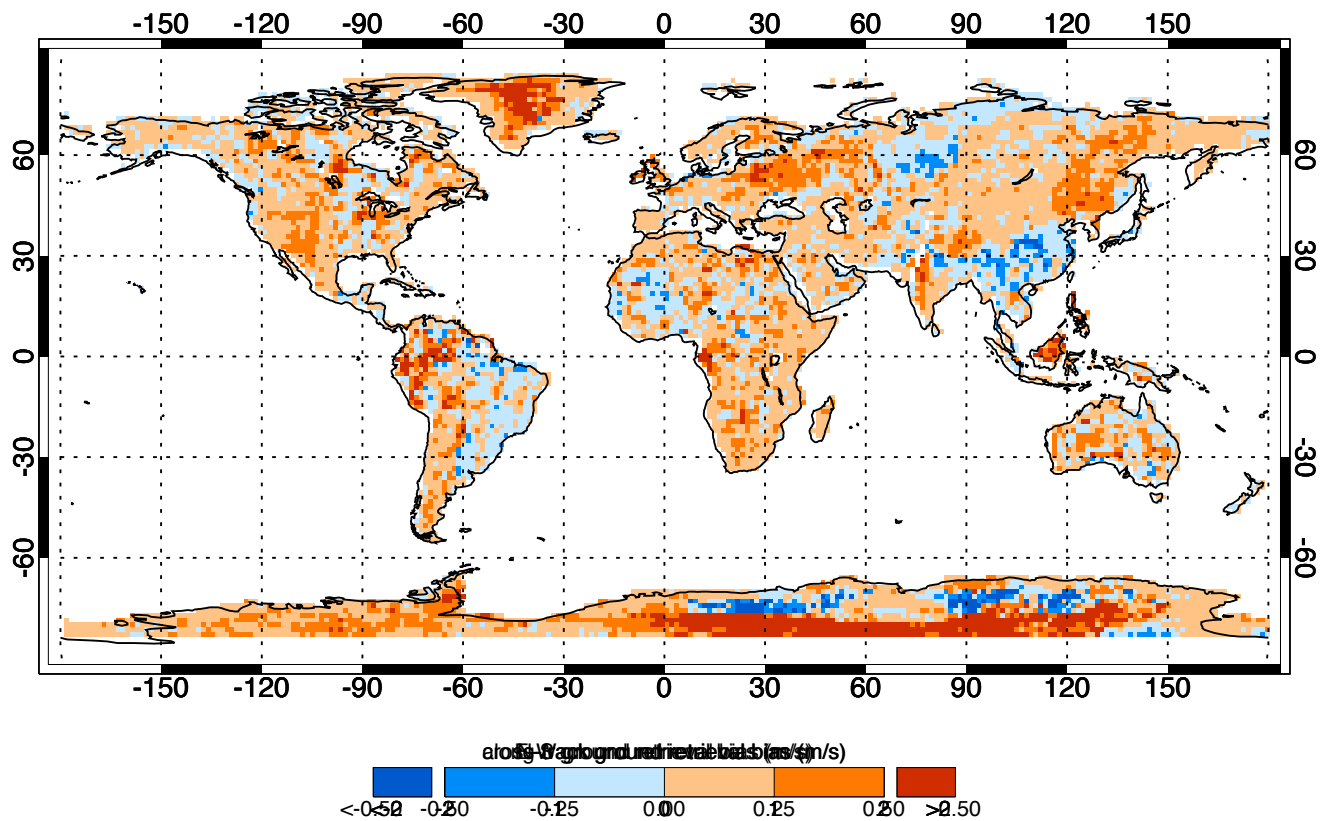
large decrease in N-S wind mean difference and rmsd

MISR SMV – Meteosat-9 CMV Height Comparison

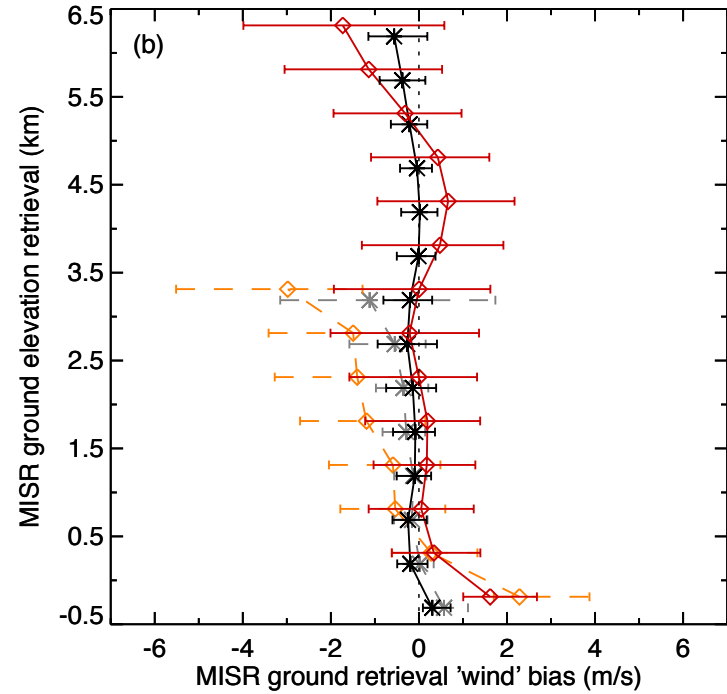
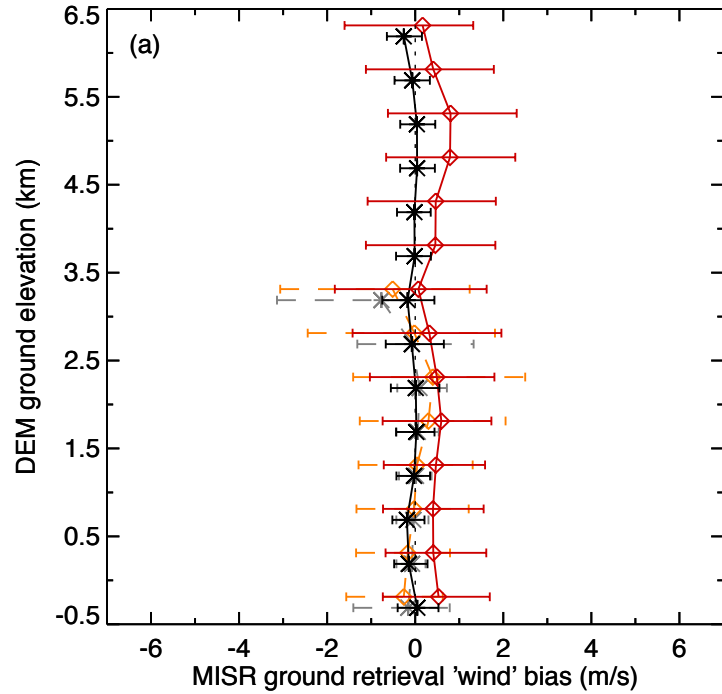


MISR Ground Retrievals – Bias Maps

hi-res bias & low W/B bias



MISR Ground Retrievals – Bias Profile



--- E-W_{low-res}

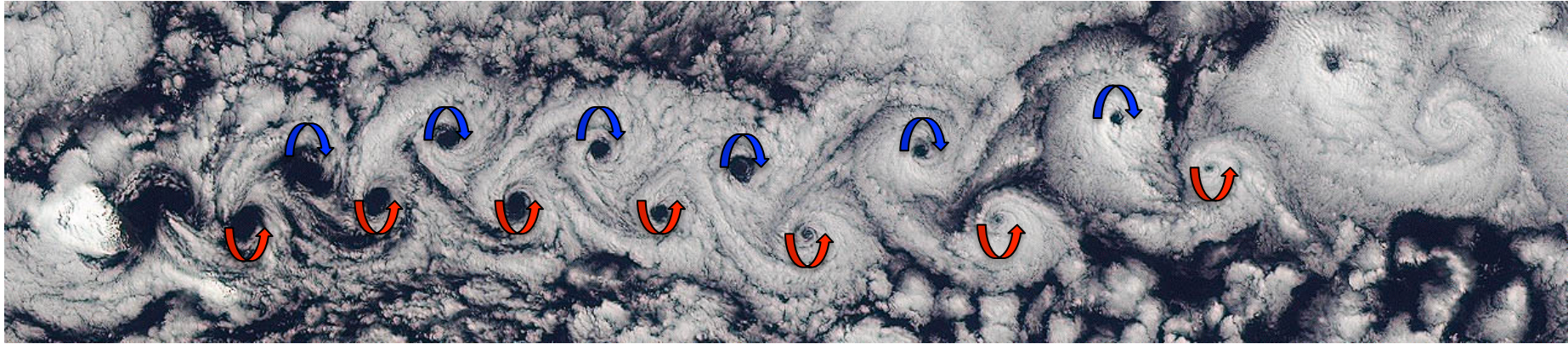
--- N-S_{low-res}

— E-W_{hi-res}

— N-S_{hi-res}

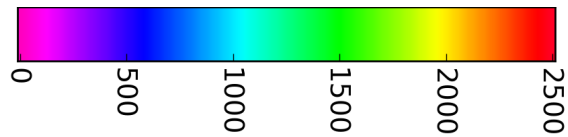
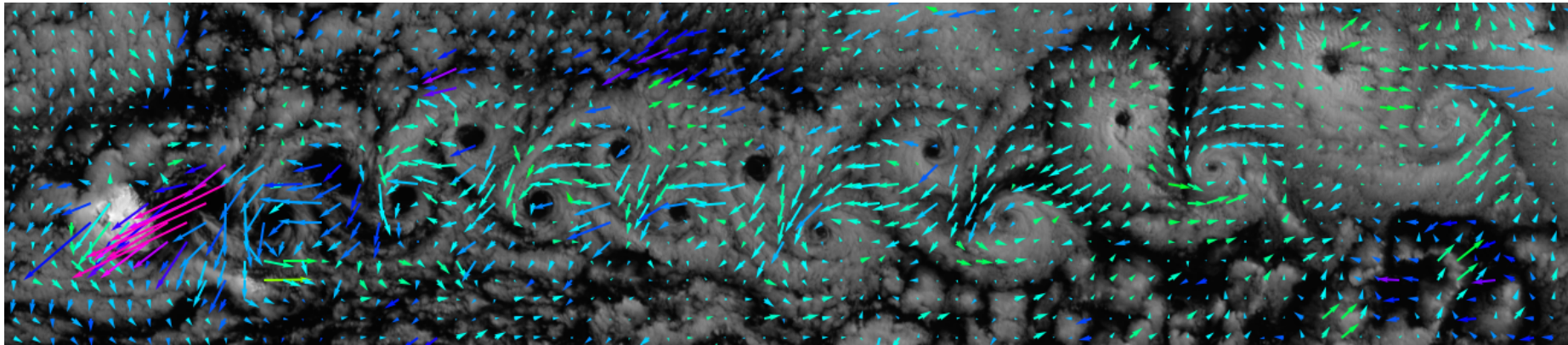
Von Kármán Vortex Street

Jan Mayen Island, 6 June 2001



Von Kármán Vortex Street

Jan Mayen Island, 6 June 2001



4.4-km wind residuals after mean wind removal (K. Mueller, C. Moroney)