Improved wind retrieval using NWP Ocean calibration

2010 IOVWST Barcelona

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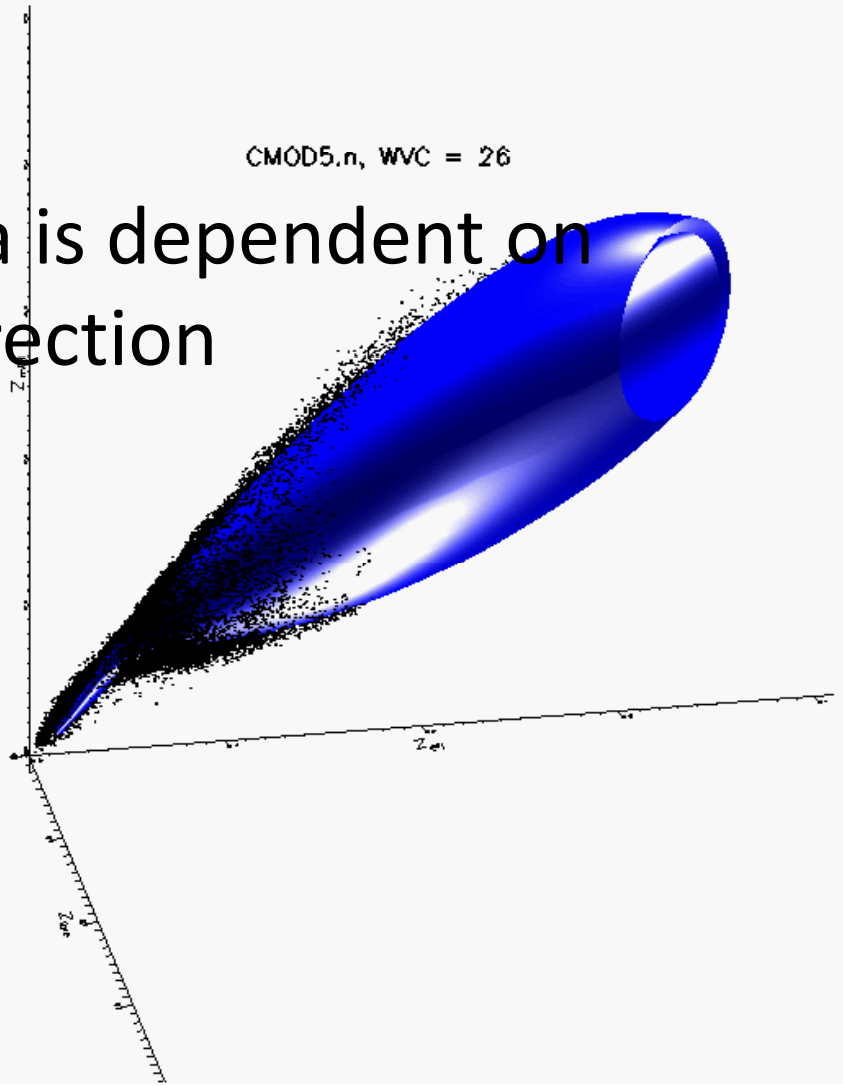
ASCAT Measurement space

- Backscatter σ^0 above sea is dependent on wind speed and wind direction
- $\sigma^0 = GMF(V, \theta, \phi)$
- Representation in 3D-measurement space

$(x, y, z)=(\sigma^0_{fore}, \sigma^0_{aft}, \sigma^0_{mid})$



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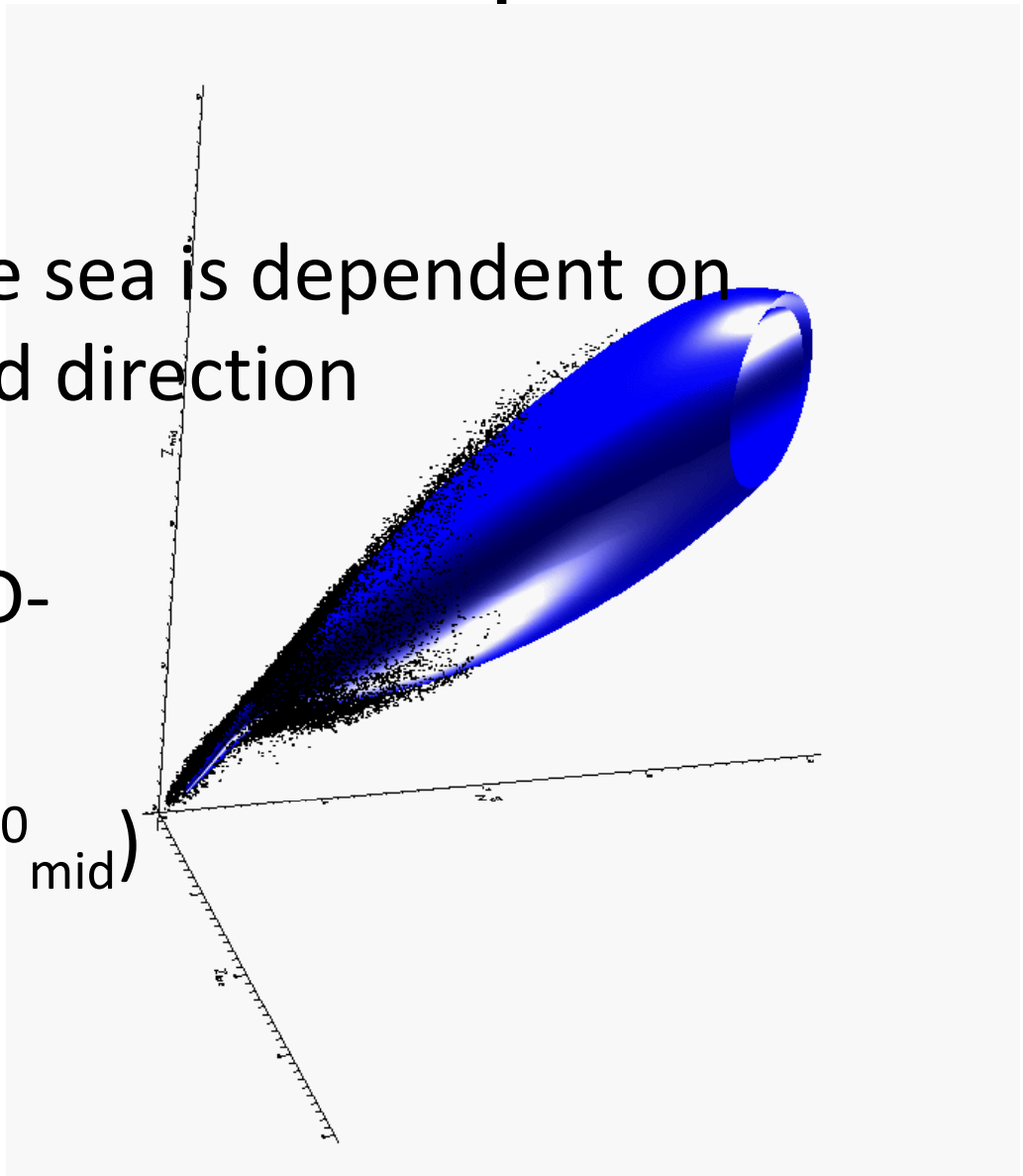
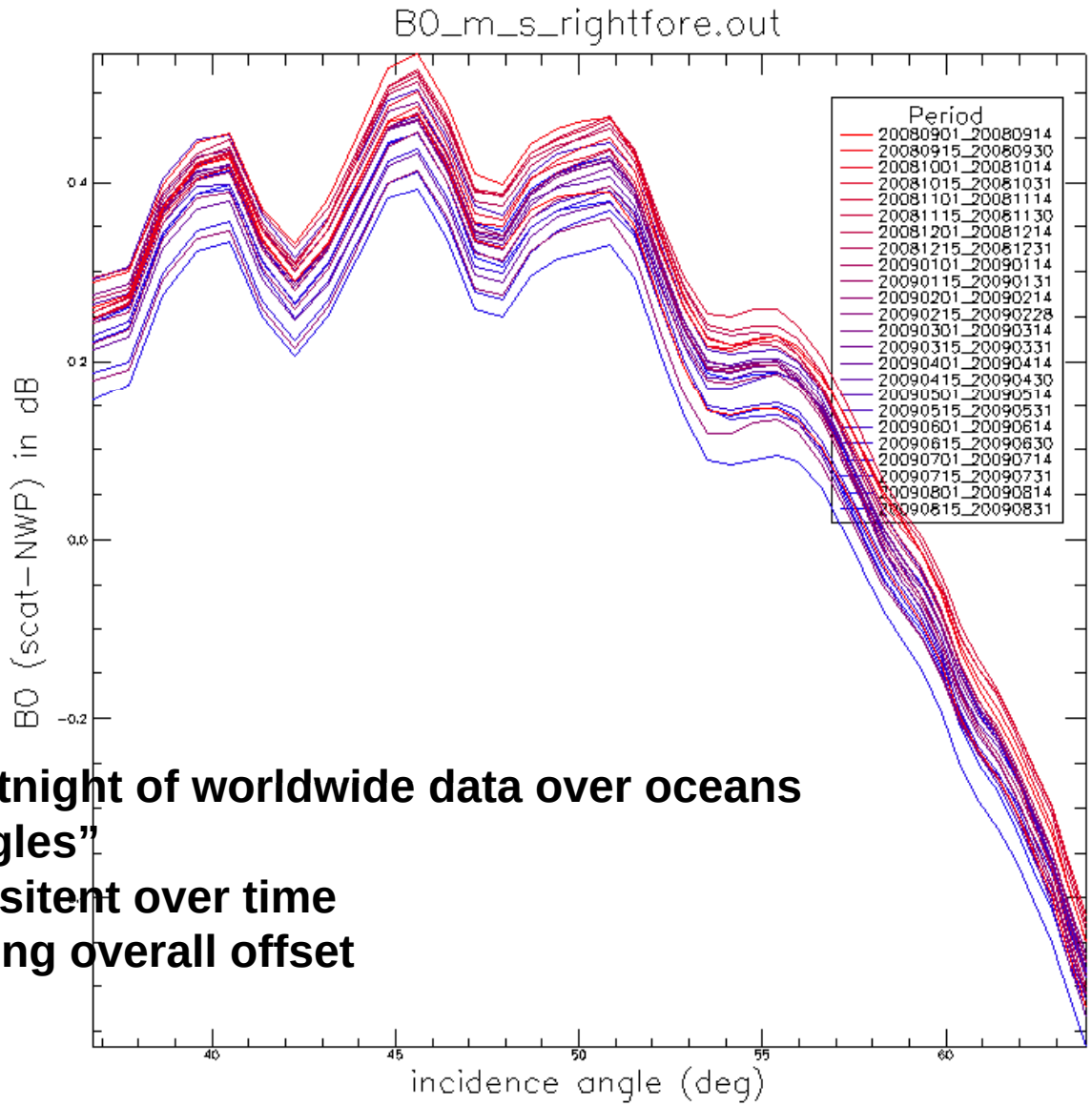


ASCAT ocean calibration

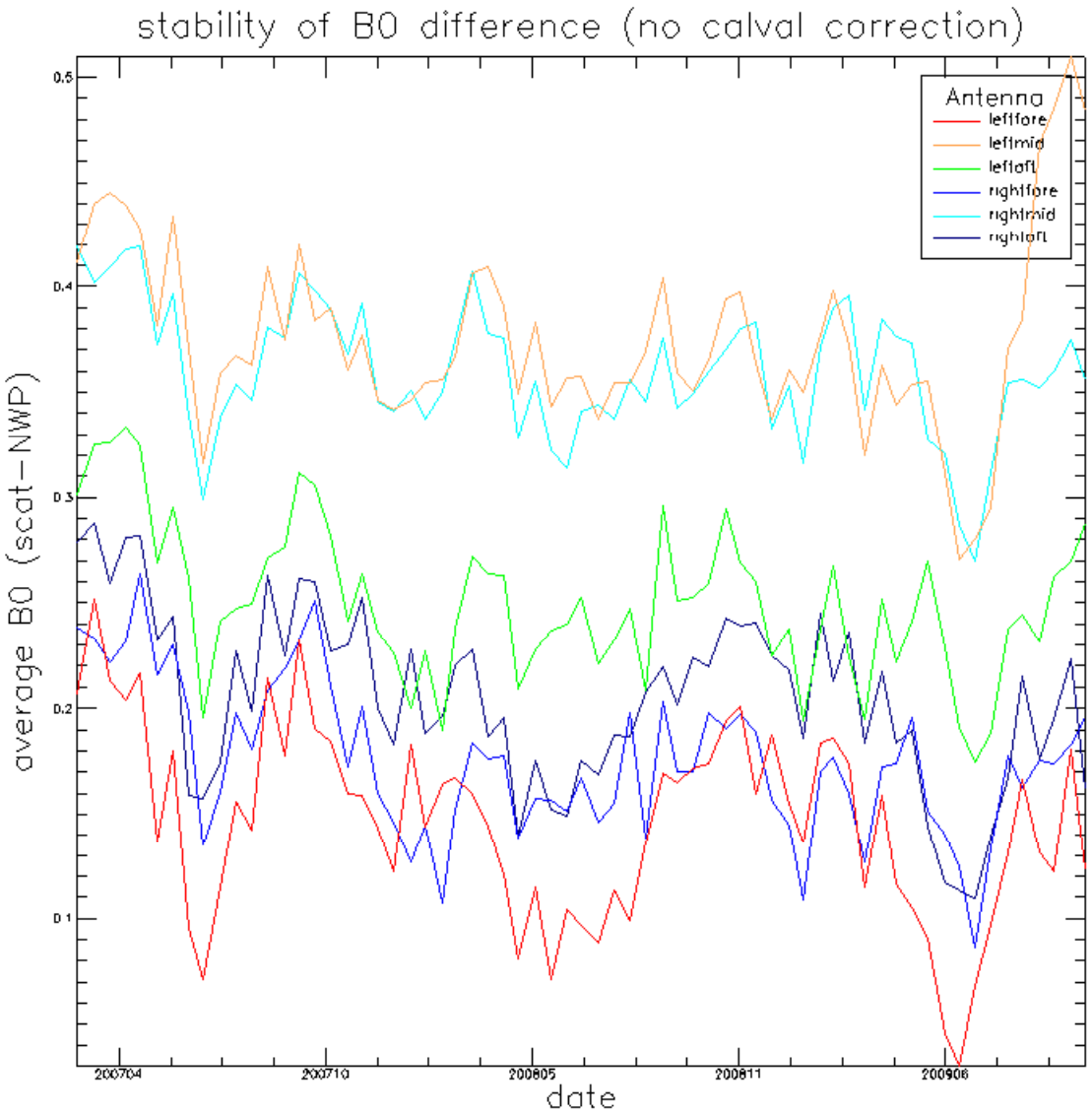
- Scatterometer backscatter triplet and NWP derived backscatter triplet are compared for a large dataset
- NWP winds are transformed into backscatter triplets with the geophysical model function CMOD5.n
- Residuals reveal information about instrument errors/measurement errors/model errors

Residual of right fore antenna



- **Each line is from a fortnight of worldwide data over oceans**
- **pattern contains “wiggles”**
- **but pattern is very persitent over time**
- **and has a slowly varying overall offset**

Timeseries over several years



- **Stable over time**
- **Seasonal variation**

Ocean calibration methods

- **Correction factors are used to obtain a high-quality wind product**
- **These correction factors are dependent on WVC (across swath location) and antenna**

VOC

Visual Ocean Calibration

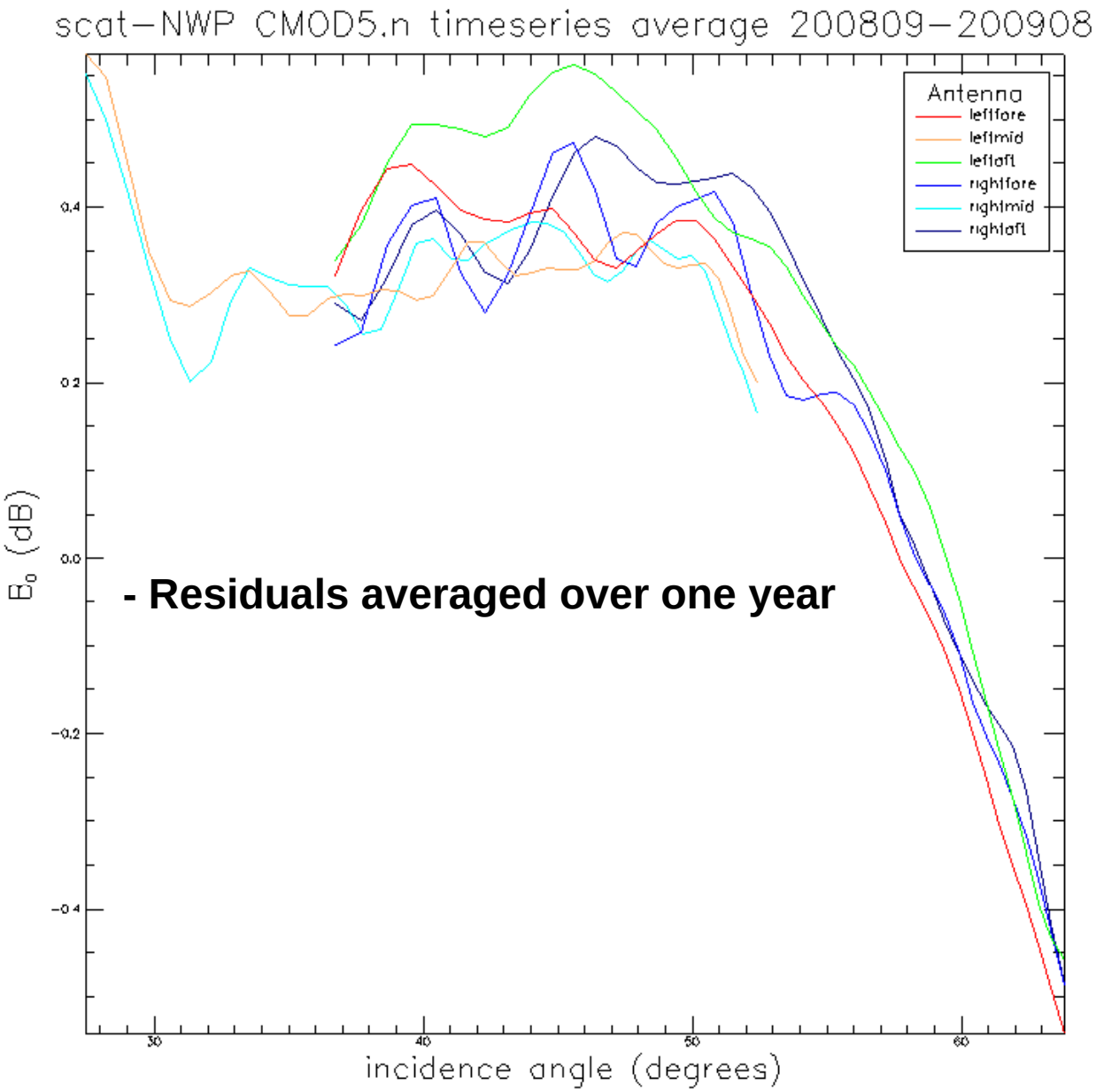
- **Visual inspection in measurement space**
- **Additional windspeed bias correction**

NOC

NWP Ocean Calibration

- **Residuals are averaged over a long period and used as correction factors**

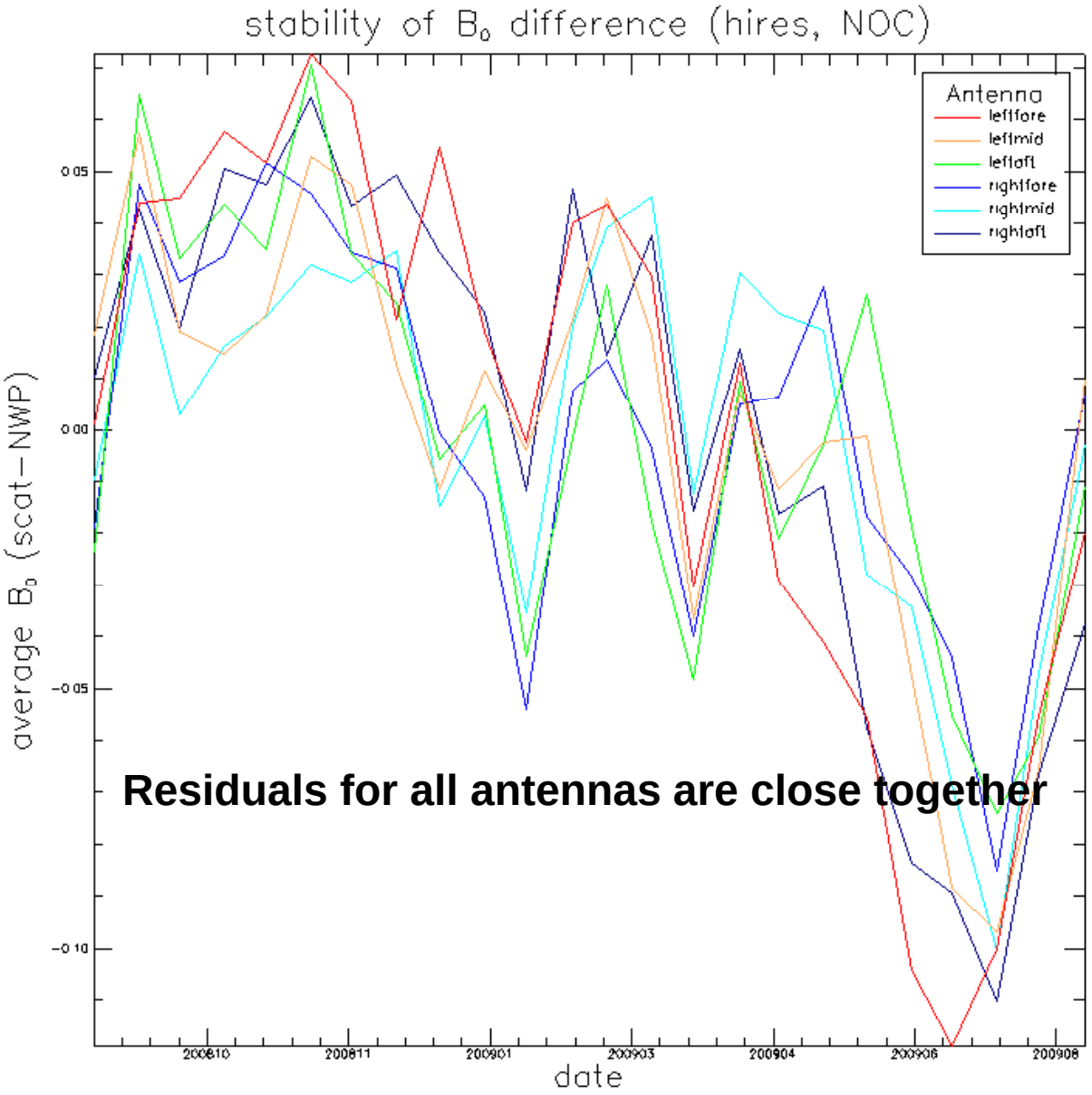
NOC correction factors



- Residuals averaged over one year

Timeseries of residuals

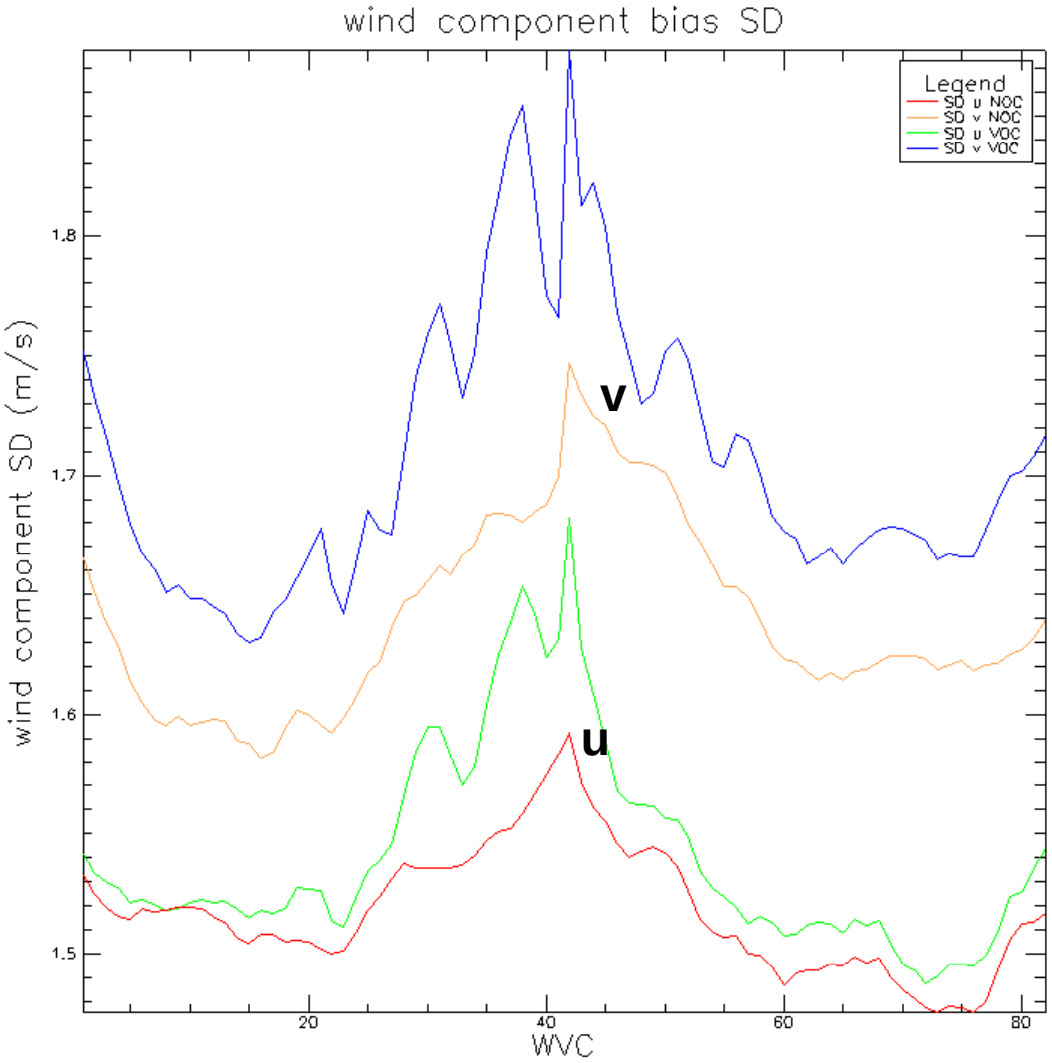
NOC



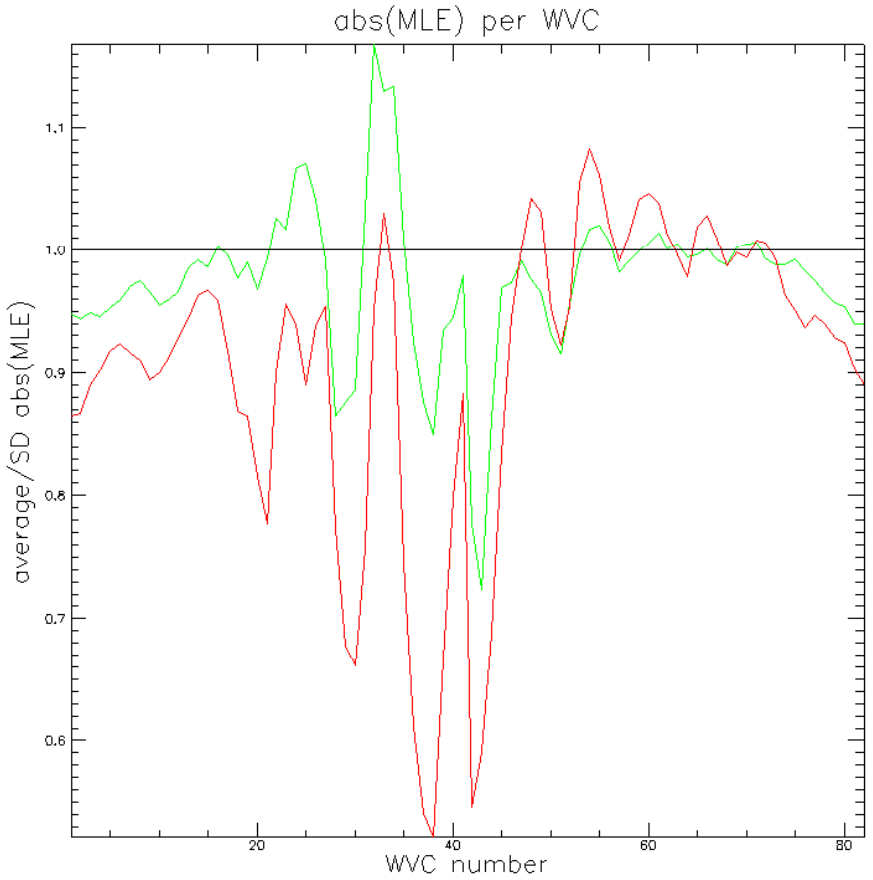
Residuals for all antennas are close together

Standard Deviation of wind components

Statistics for NOC is systematically better than for VOC



MLE statistics

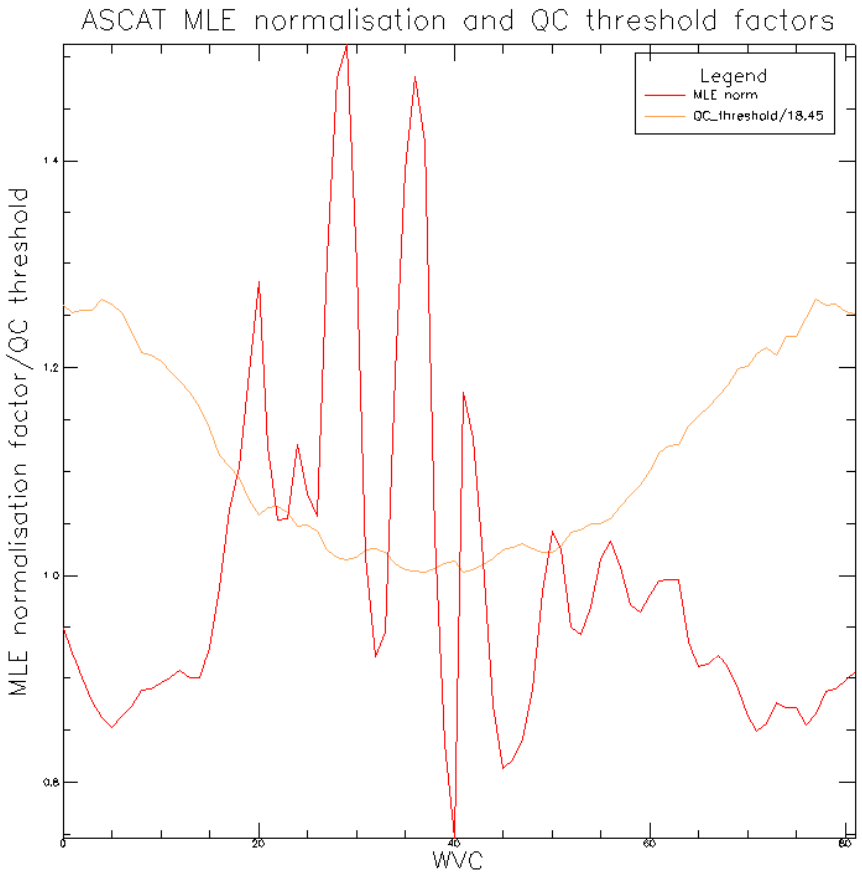


VOC
NOC

MLE statistics better for NOC than for VOC

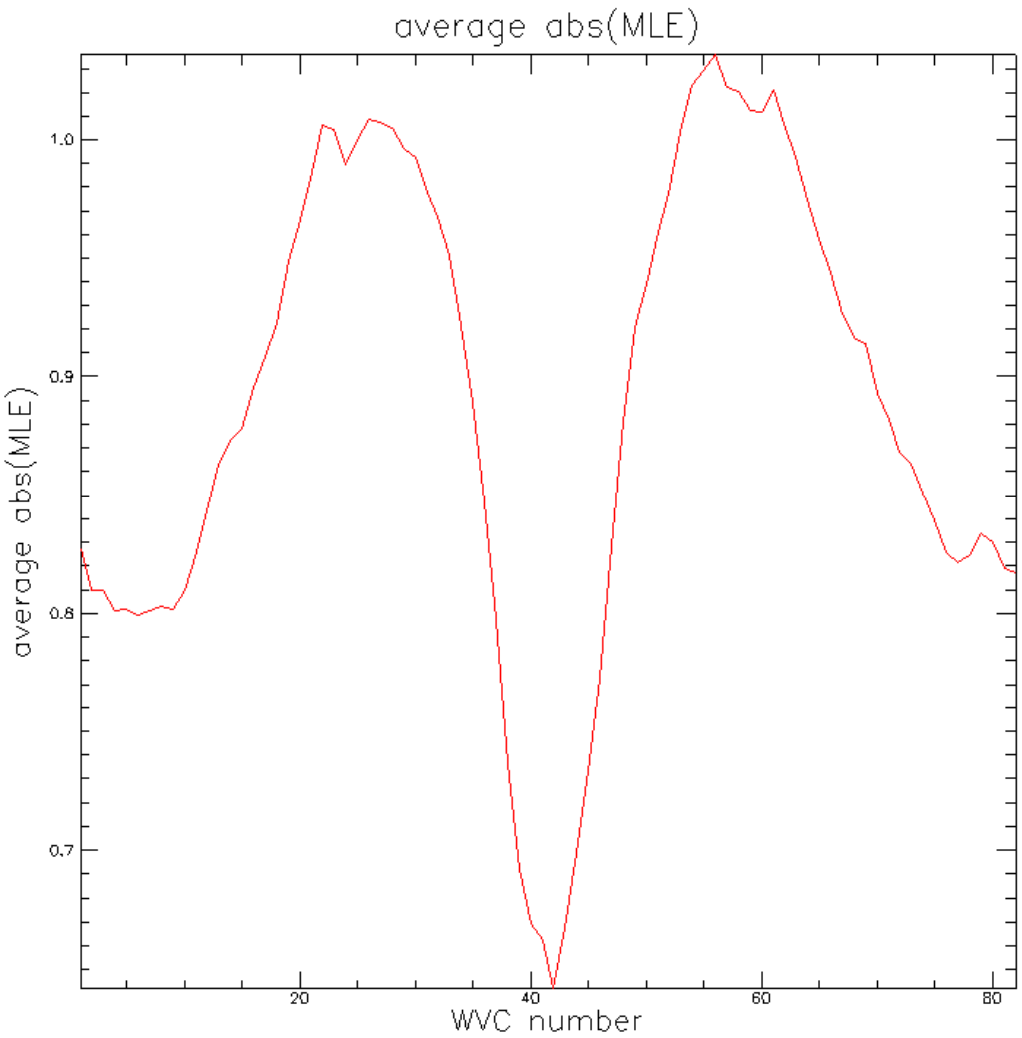
MLE normalisation

VOC



MLE normalisation function is strongly WVC-dependent

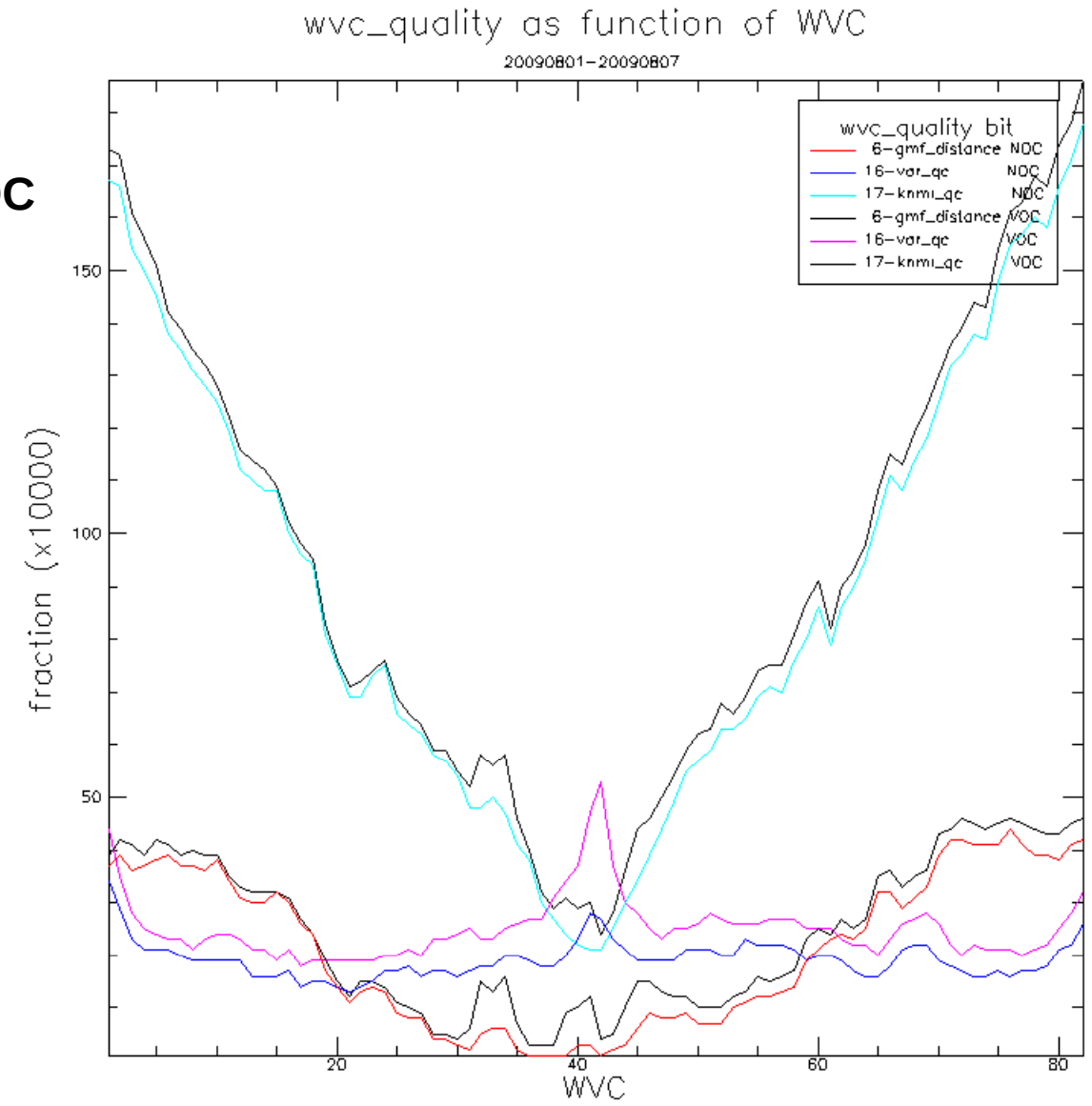
NOC



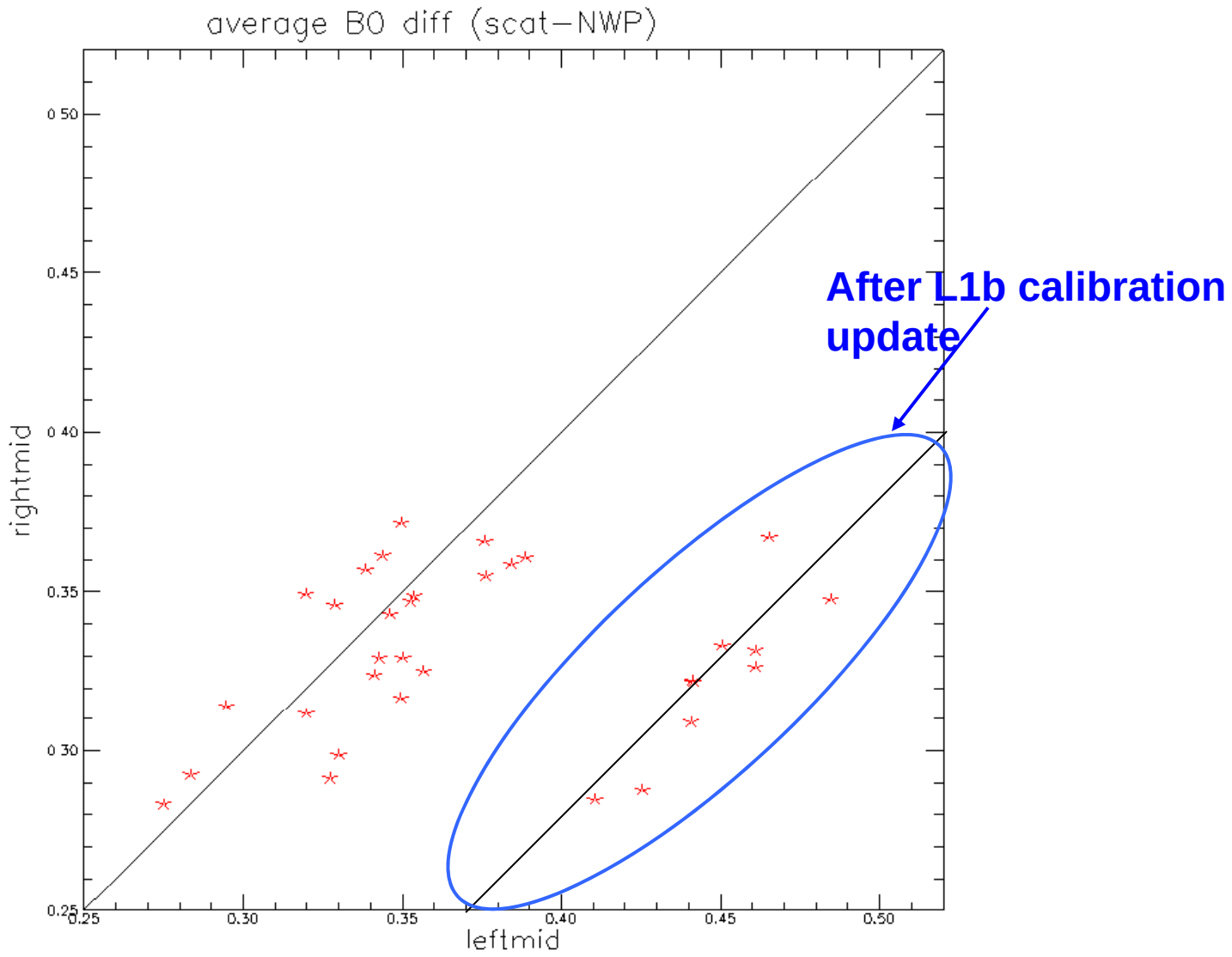
- **Reprocessed with NOC-corrections applied and without MLE normalisation factors**
- **MLE is smooth function of incidence angle**

Quality Control rejection rate

QC rejection rate slightly lower for NOC method



September 2009 Level1b calibration update



Conclusions

- VOC and NOC method both yield high-quality winds
- NOC statistics for wind and MLE are slightly better than VOC statistics
- NOC corrections yields symmetrical patterns for MLE, wind, and other parameters
- This indicates a dependency on incidence angle only

Thank you!