Improved wind retrieval using NWP Ocean calibration

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ASCAT Measurement space

- Backscatter $\sigma^0$ above sea is dependent on wind speed and wind direction
- $\sigma^0 = GMF(V, \theta, \phi)$
- Representation in 3D-measurement space $(x, y, z) = (\sigma^0_{\text{fore}}, \sigma^0_{\text{aft}}, \sigma^0_{\text{mid}})$
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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 persistent 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

scat-NWP CMOD5.n timeseries average 200809–200908

- Residuals averaged over one year
Timeseries of residuals

stability of $B_0$ difference (hires, NOC)

Residuals for all antennas are close together
Standard Deviation of wind components

Statistics for NOC is systematically better than for VOC
MLE statistics better for NOC than for VOC
MLE normalisation function is strongly WVC-dependent
• 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

After L1b calibration update

![Graph showing average BO diff (scat-NWP)]
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!