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Meteorological Institute  
*Ministry of Infrastructure and the  
Environment*

## Reconciliation of C and Ku-band Geophysical Model Functions

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**OSI SAF**  
Ocean and Sea Ice



**NWP SAF**  
Numerical Weather Prediction

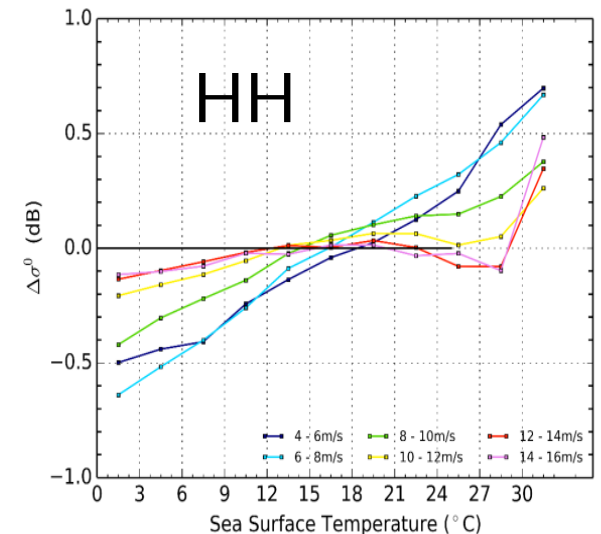
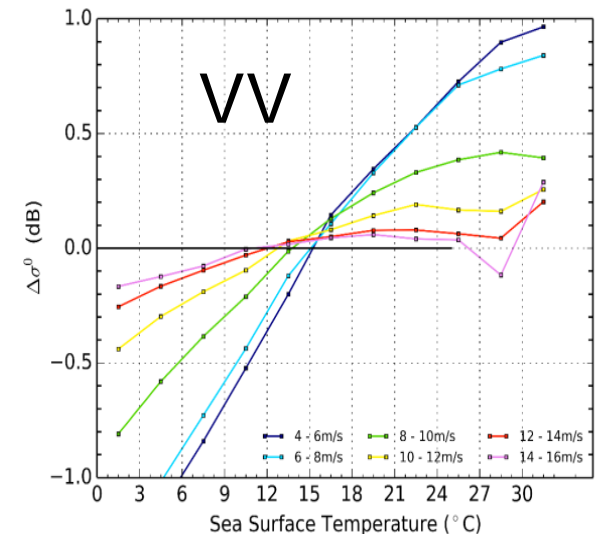
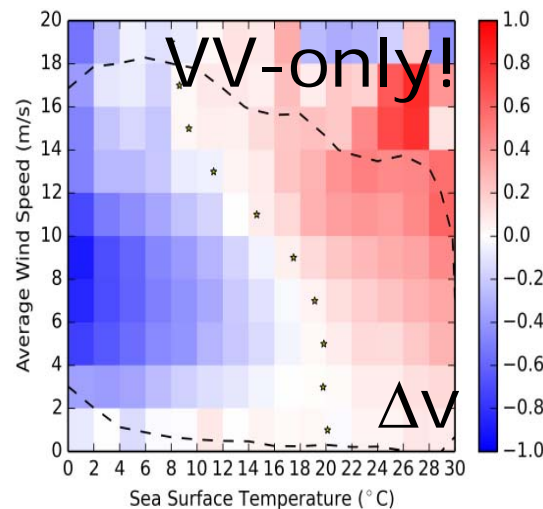
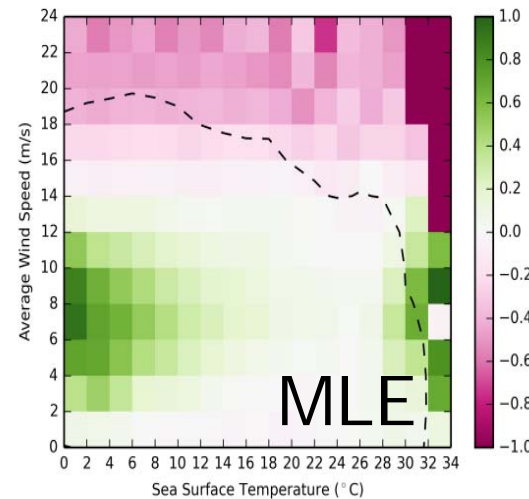


**EUMETSAT**



# SST dependence Ku VV/HH

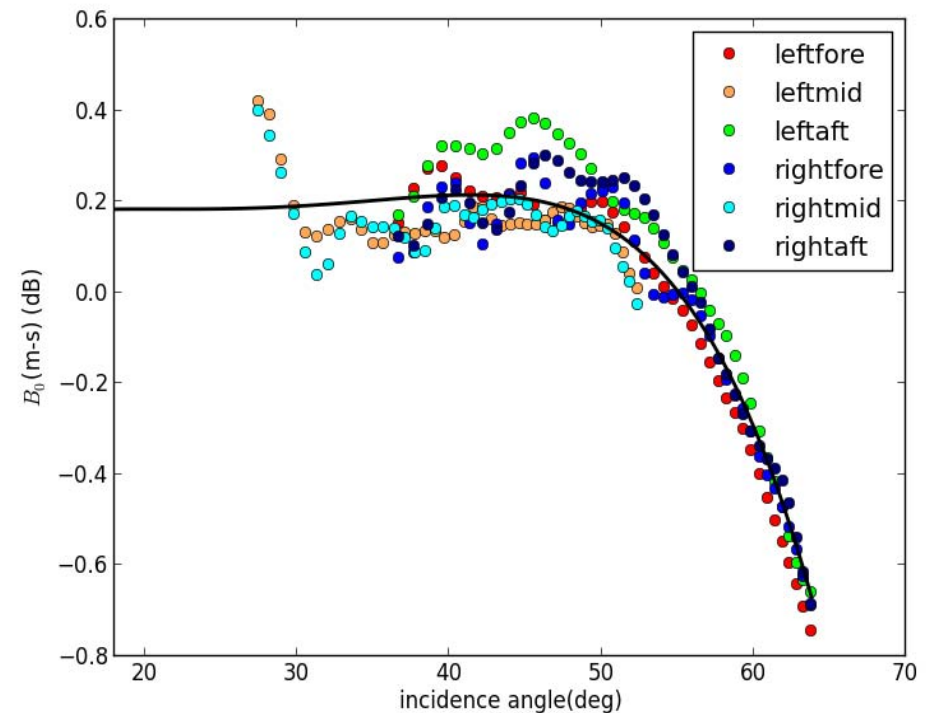
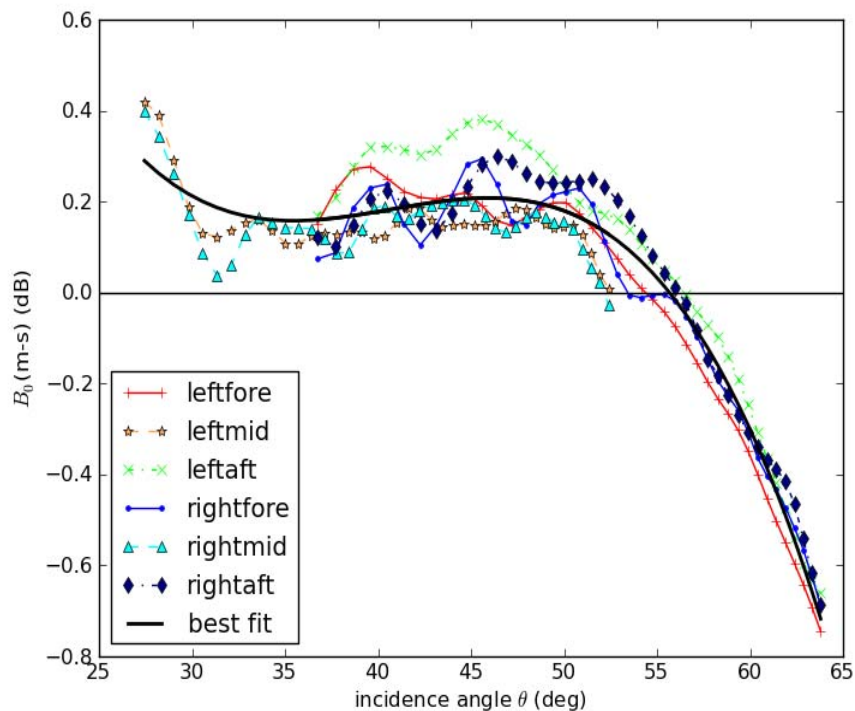
- Consistency of VV and HH (MLE) depends on SST
- RSCAT-ASCAT depends on SST too
- Explained mainly by effects of viscosity, incidence angle, surface tension, . . .
- Relative changes correspond to physical e.m. scattering models > 5 m/s
- Probably atmospheric path variability too near tropical moist convection





# CMOD6 for ERS

- Originally CMOD6 was defined for ASCAT incidence angle range
- Extend CMOD6 to the lower ERS incidence angle range



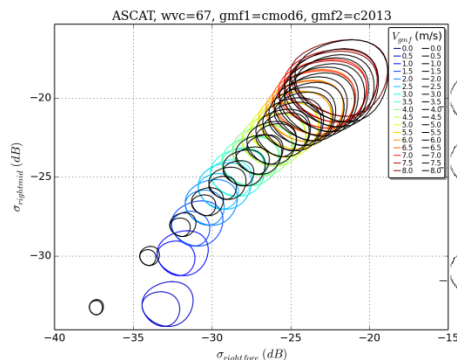


# The TAO of GMF development

## CMOD7=CMOD6+C2013

### CMOD6

- Based on ERS/ASCAT/NWP
- Long track record of high quality wind product generation
- Flawed for low winds
- WVC-dependency of the wind pdf

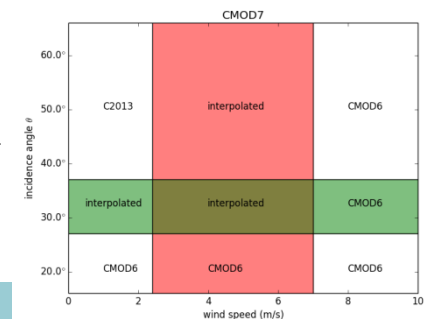
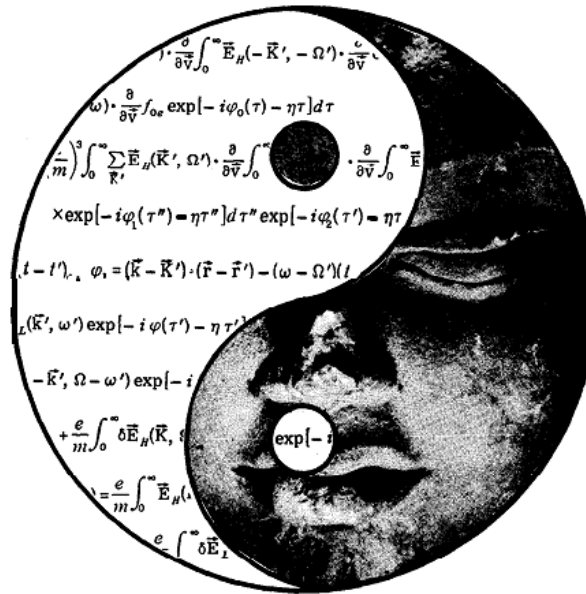


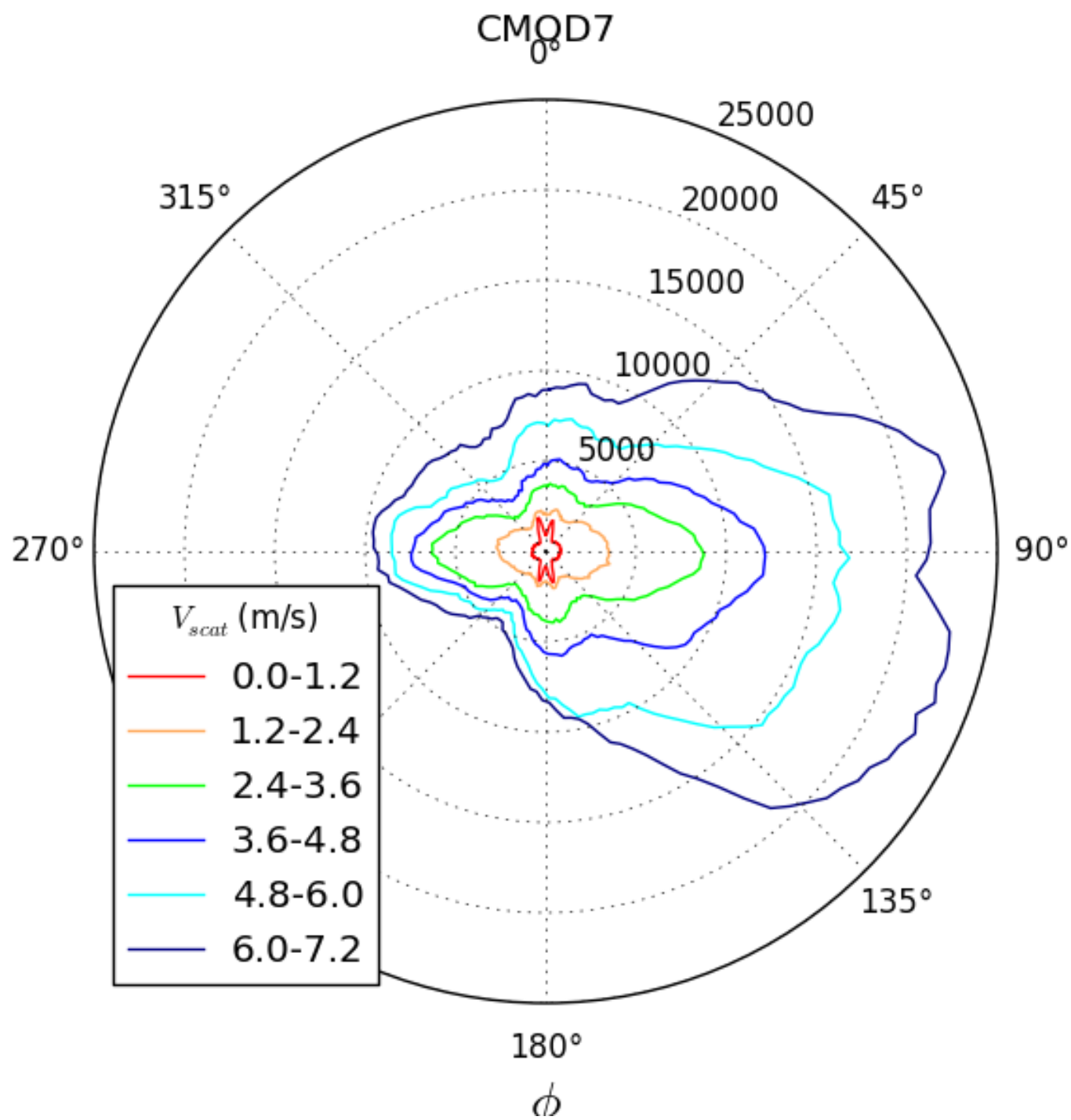
- Uses the best of CMOD6 and C2013
- Higher Order Calibration is used to make the wind pdfs independent of WVC
- Aimed at consistency between ERS and ASCAT

### CMOD7

### C2013

- Based on ASCAT/NWP/SSMI/Windsat
- Good comparisons with other satellite wind data
- Discrepancy with NWP high winds
- No WVC-dependency of the wind pdf



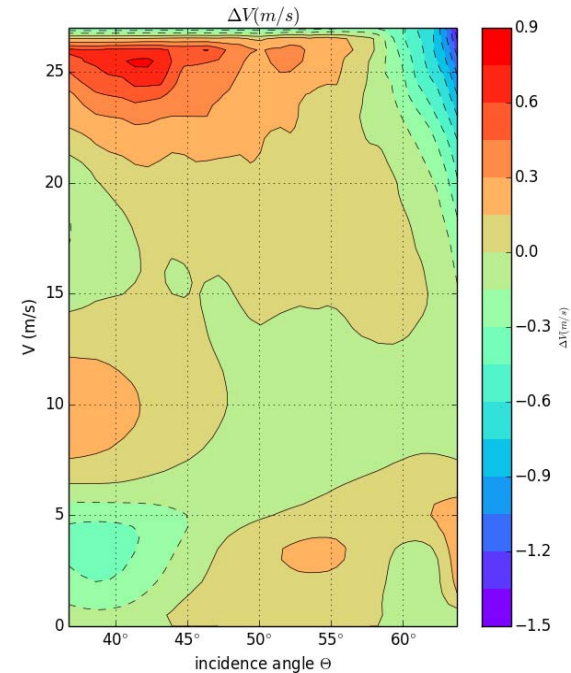
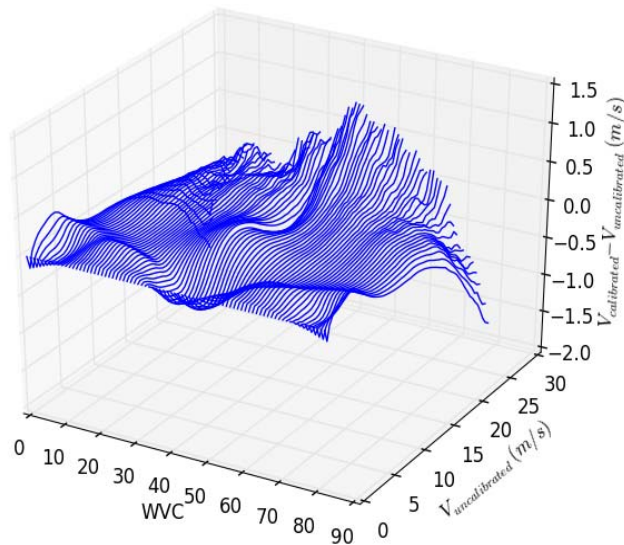






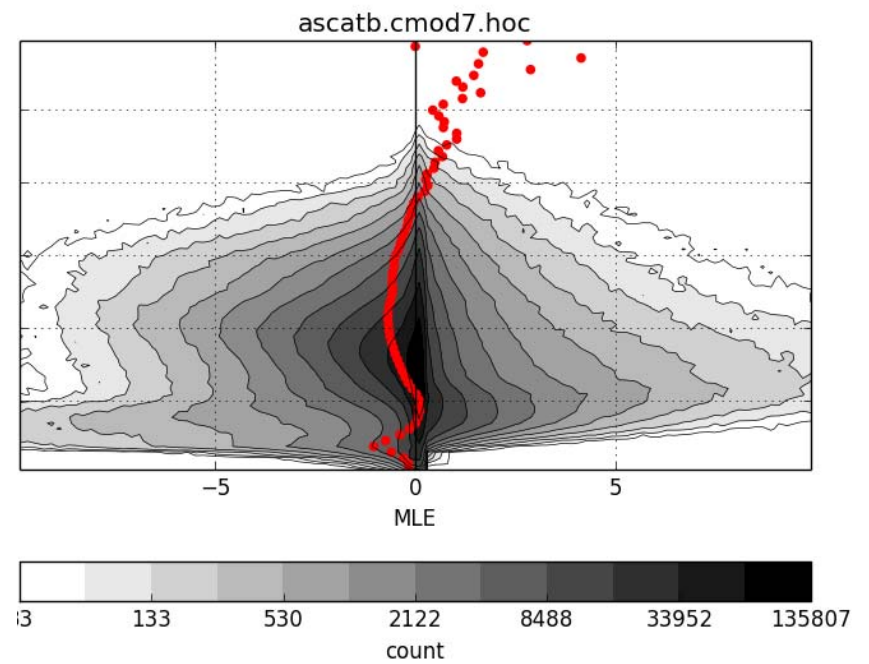
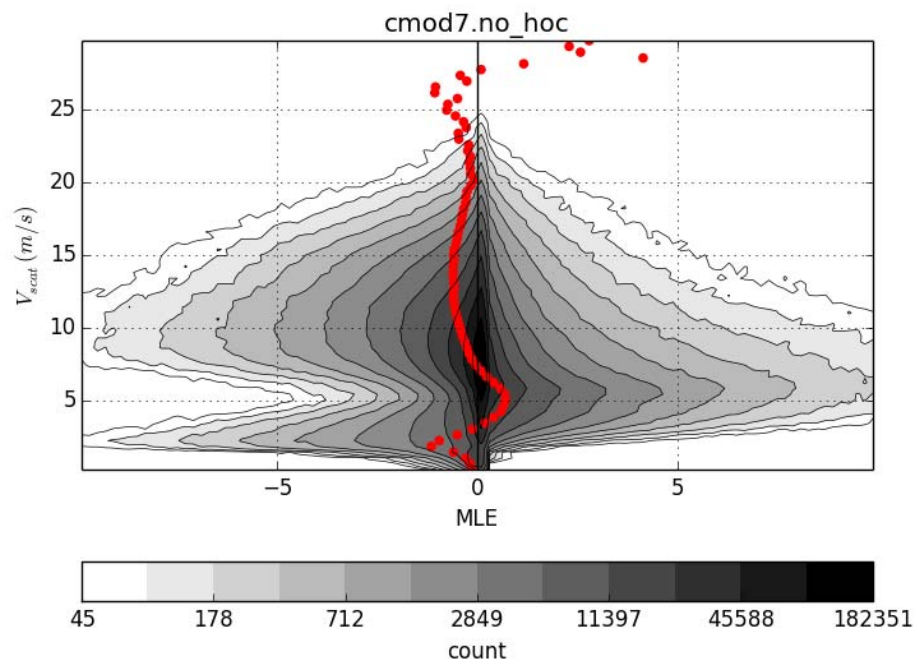
# Higher Order Calibration

- Used to map the WVC-dependent wind speed pdfs on to each other
- HOC corrections  $\Delta V(V, \text{WVC}) \rightarrow \Delta V(V, \theta), \Delta \sigma(V, \theta)$





# ASCAT MLE





# Conclusions

- CMOD6 shows flawed wind pdfs for  $V < 3$  m/s
- C2013 is biased for winds  $> 15$  m/s with respect to buoy winds (which experts trust up to 25 m/s)
- CMOD7 uses a mix of CMOD6 and C2013 for wind speeds between 2.4 and 7.0 m/s
- Comparing CMOD7 with CMOD6, wind statistics for low winds is improved while the characteristics for median and high winds are retained.
- HOC is successful in making the wind pdfs WVC-independent
- Applying CMOD7 to ERS gives erratic wind pdfs, further investigation needed.



# CMOD7v1

