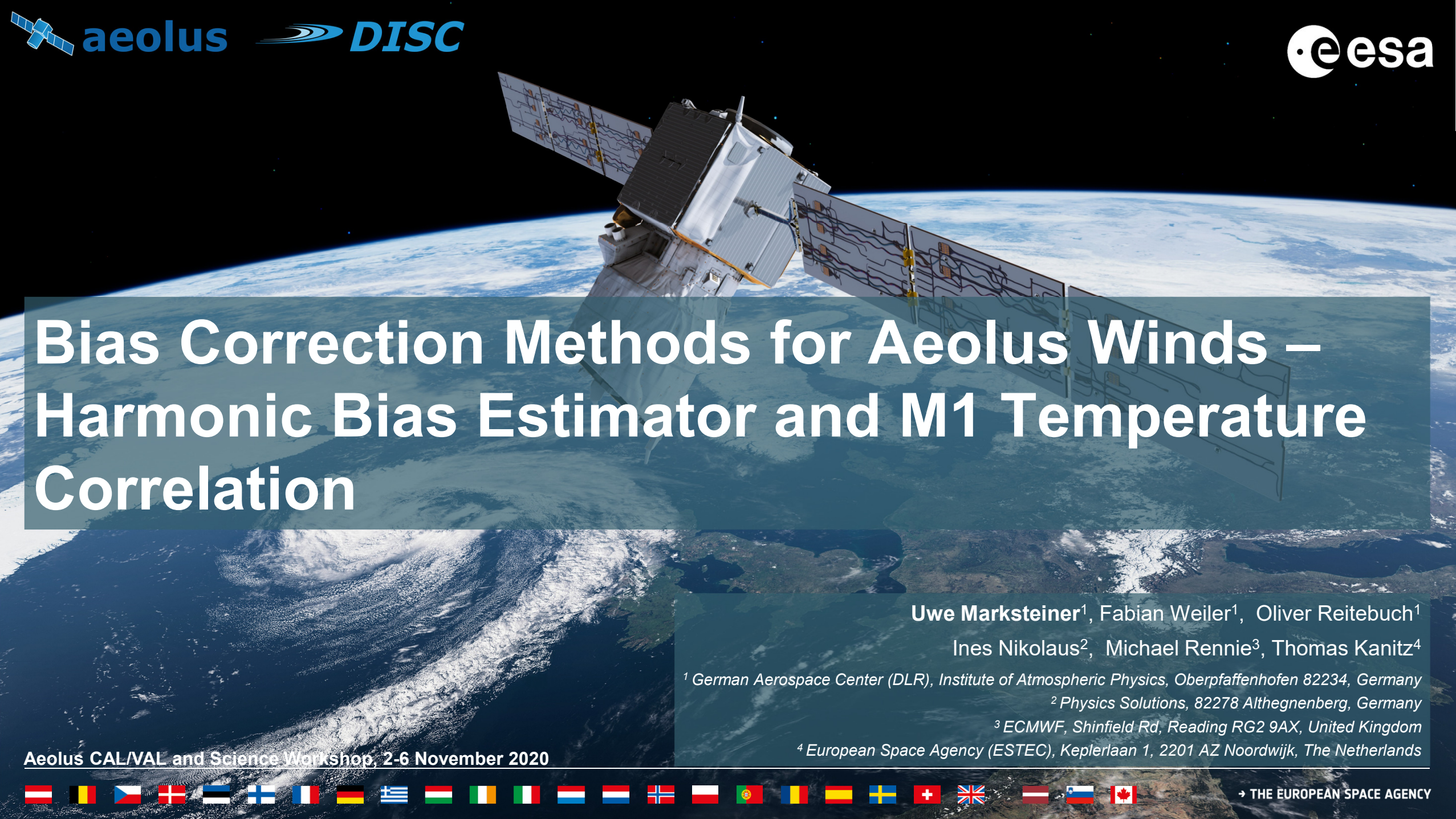

Bias Correction Methods for Aeolus Winds – Harmonic Bias Estimator and M1 Temperature Correlation

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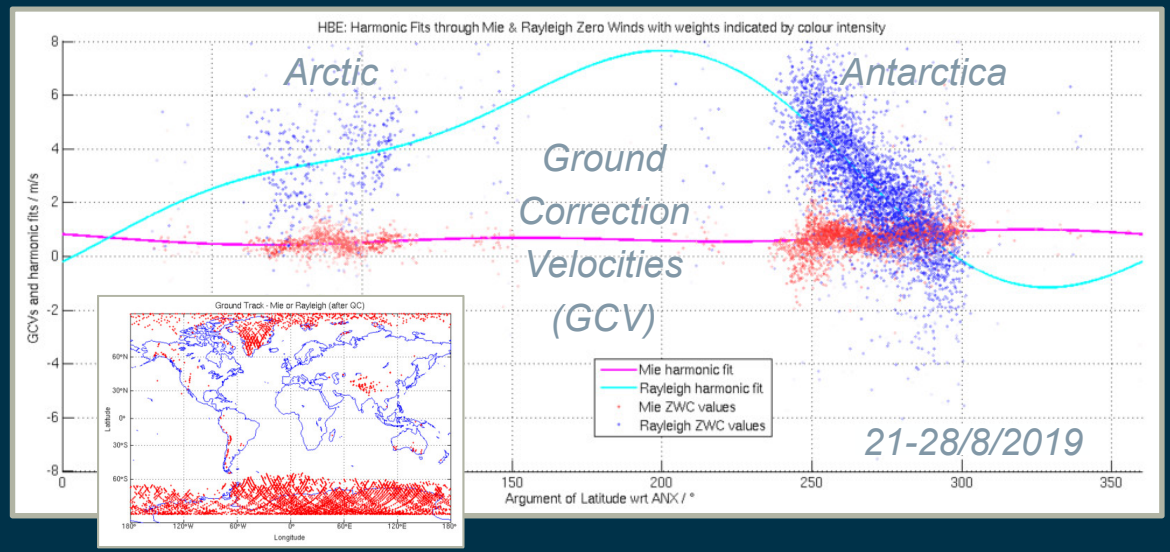
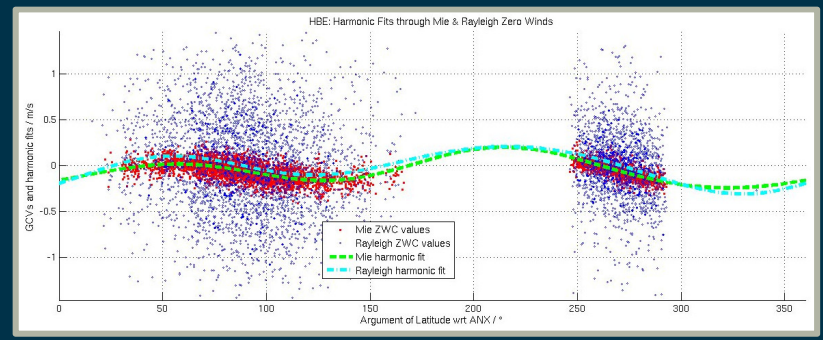
Aeolus CAL/VAL and Science Workshop, 2-6 November 2020

Harmonic Bias Estimation: assumption vs. reality

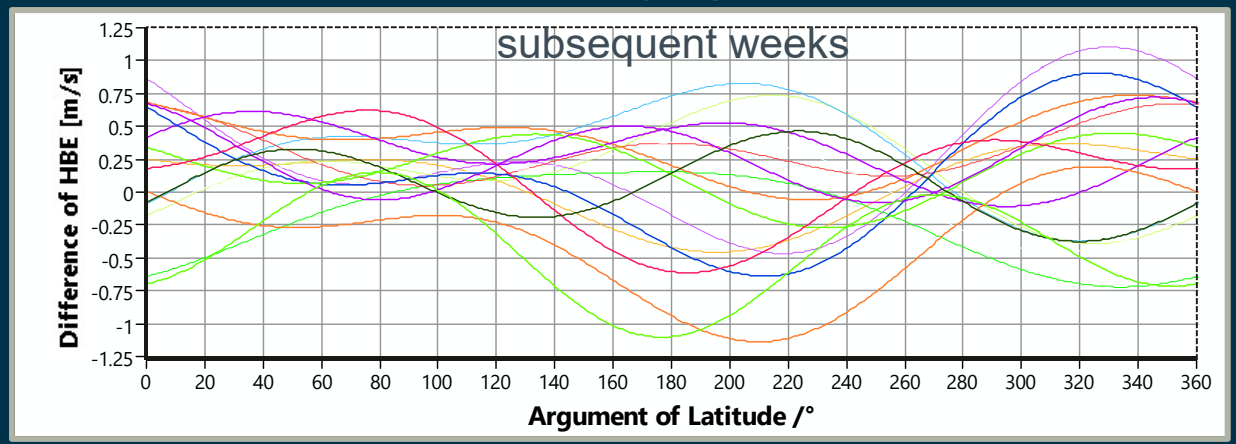


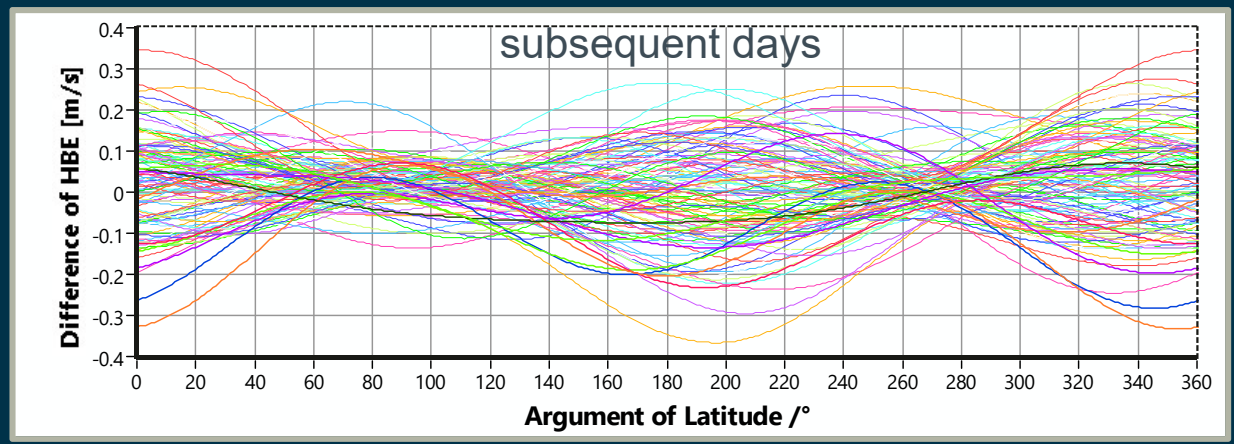
- Pre-launch expectations: mostly harmonic bias due to pointing
- Post-launch observations: varying bias shape of L1B GCVs
- Mie less affected than Rayleigh channel (~ factor 10)
- Lack of valid ground returns for low albedo surfaces (sea & land)
- HBE not capable of modelling longitude dependence

End-to-End Simulation (2018)



Difference of harmonic fits for Rayleigh data from 11/09/2018 – 07/01/2019:

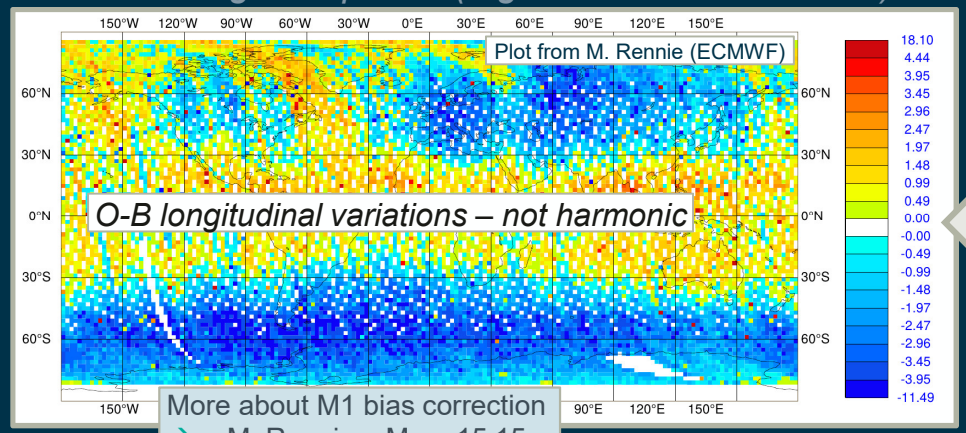




M1 temperature correction / Range Dependent Bias

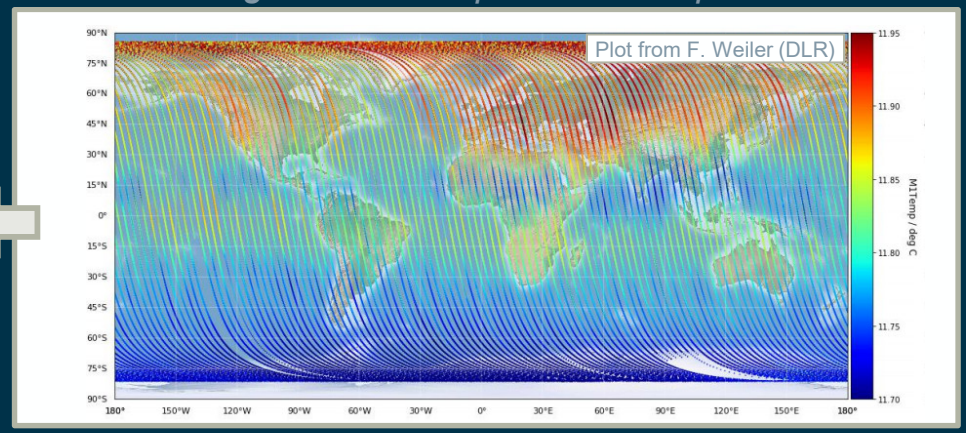
esa

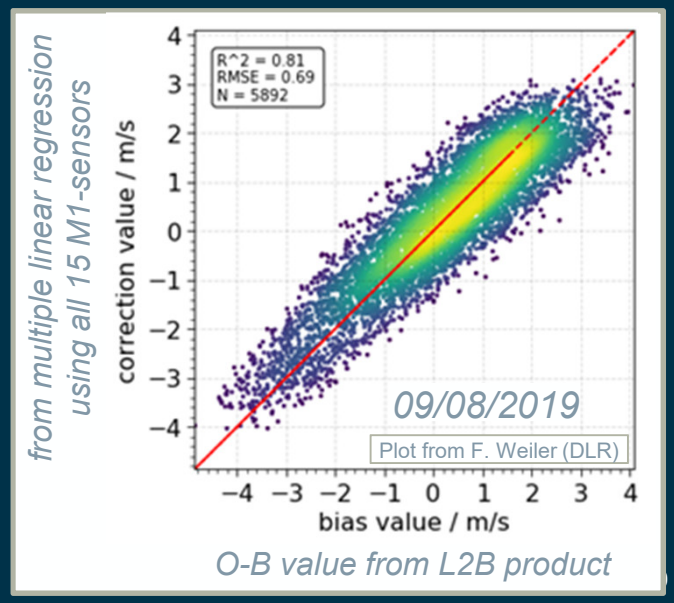
Ascending orbit phase (e.g. 6/8/2019 to 7/9/2019)



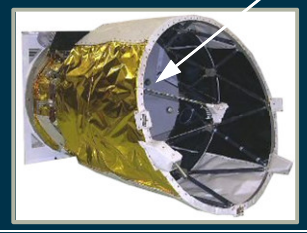
More about M1 bias correction
- → M. Rennie: Mon. 15:15
- → M. Rennie: Wed. 17:45

Average M1 telescope mirror temperature





- L2B Rayleigh-clear biases varied with geolocation and with patterns matching the temperatures of the primary mirror (M1, Ø 1.5 m)



- Another error assumed pre-launch: **Range Dependent Bias** (RDB) = 0.205 MHz/km *(Rayleigh, off-nadir)*
- Determination of HBE and RDB is interlaced
- If existing, then the RDB is about a factor 10 less than anticipated