

Comparison of Mode-S EHS vs. MRAR

Data Assimilation Working Days 2020
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Outline

- issue description
- statistical analysis
- ICAO addresses
- single flight OMG departures
- EHS temperature calculation methods

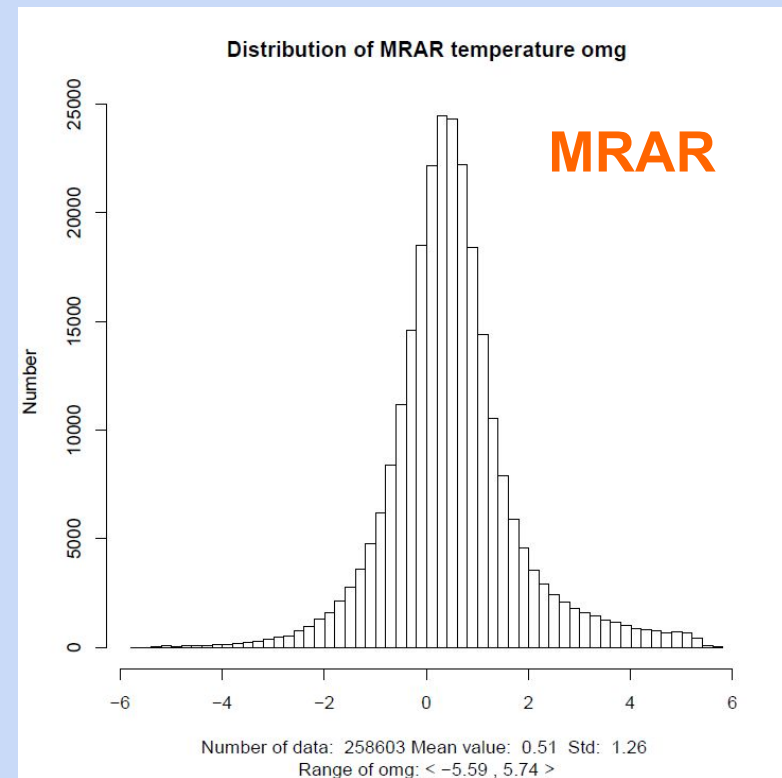
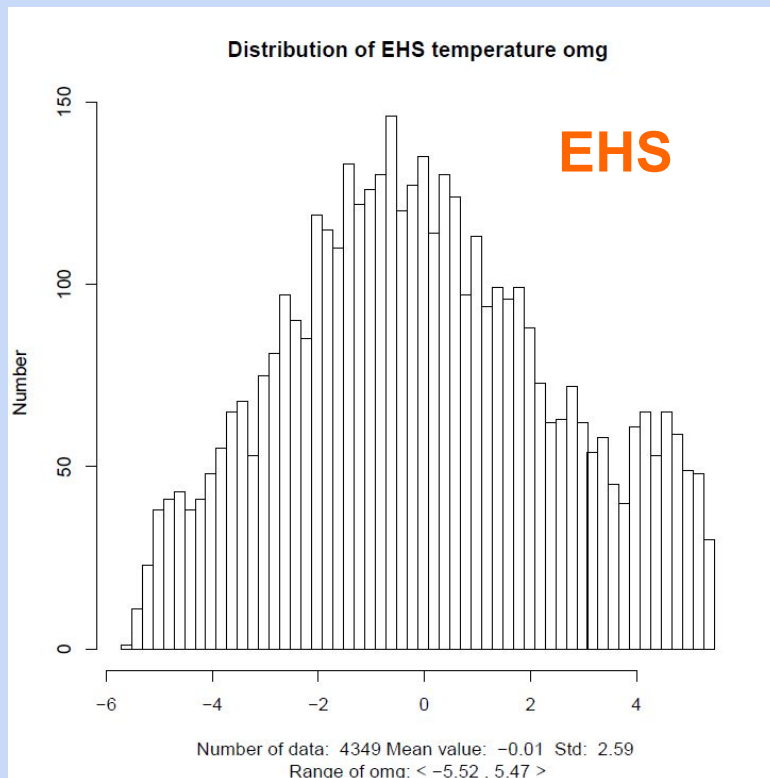
Issue description

- temperature measurements
- Buchtuv kopec (CR) radar

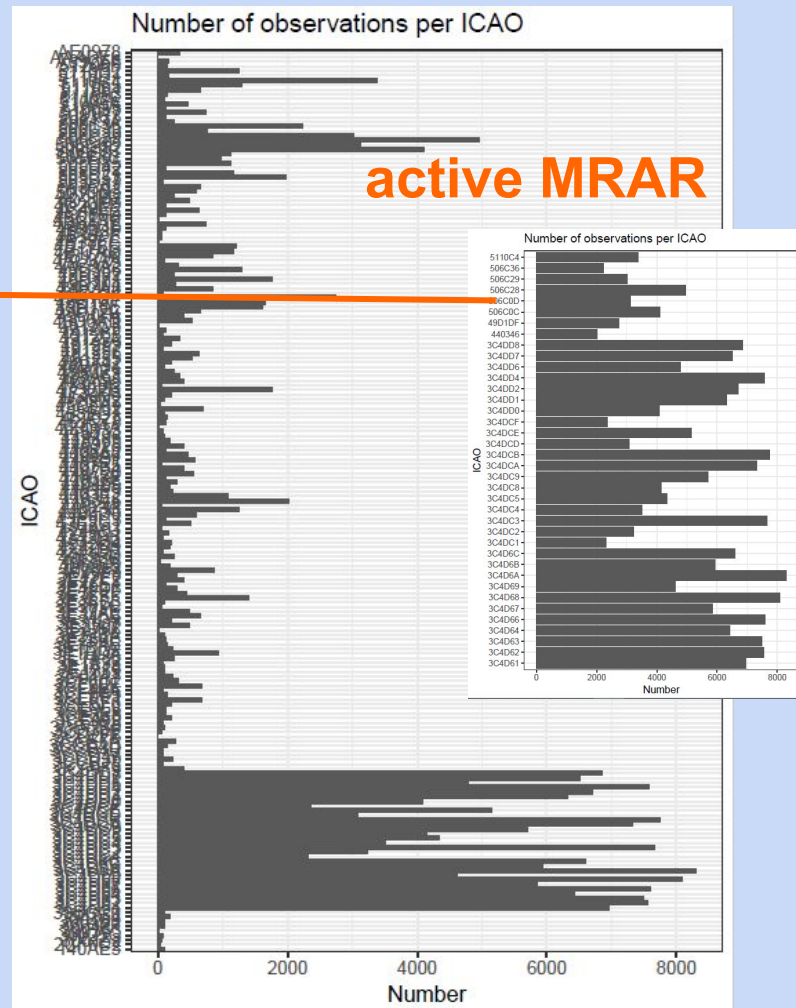
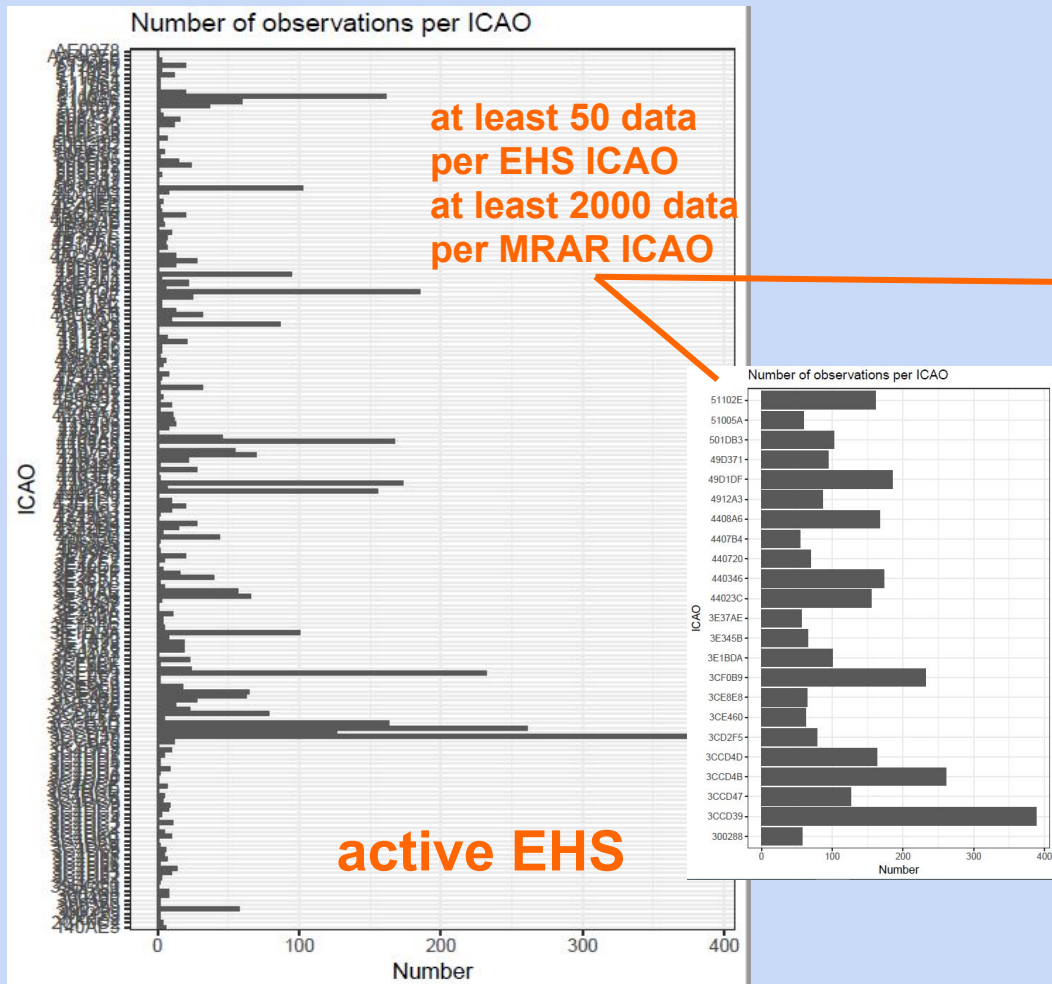
⇒ large differences in EHS and MRAR data
from the same aircraft

Statistical analysis

data sample Jan-Feb 2018

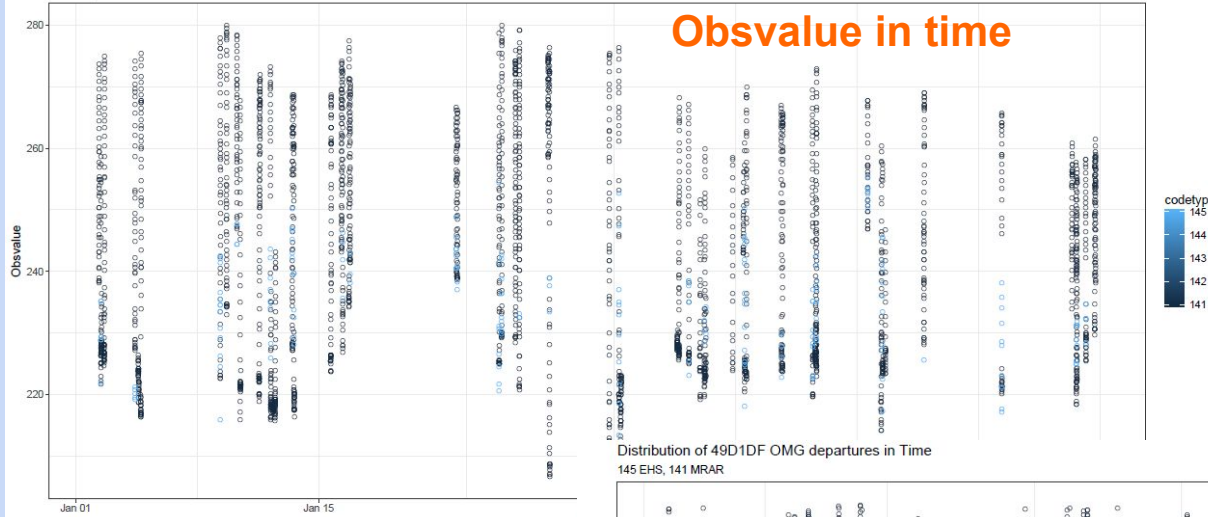


EHS vs. MRAR ICAO addresses

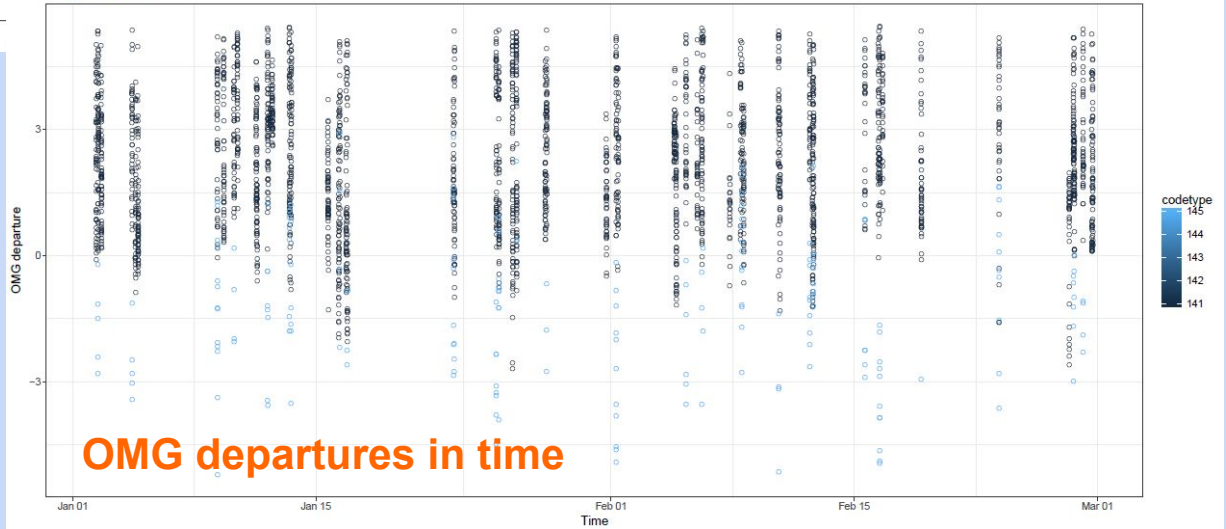


Single flight OMG departures

Distribution of 49D1DF Obsvalues in Time
145 EHS, 141 MRAR



Distribution of 49D1DF OMG departures in Time
145 EHS, 141 MRAR



EHS temperature calculation

EHS temperature derivation

$$T = 0,0024923 \left(\frac{v_t}{M} \right)^2$$

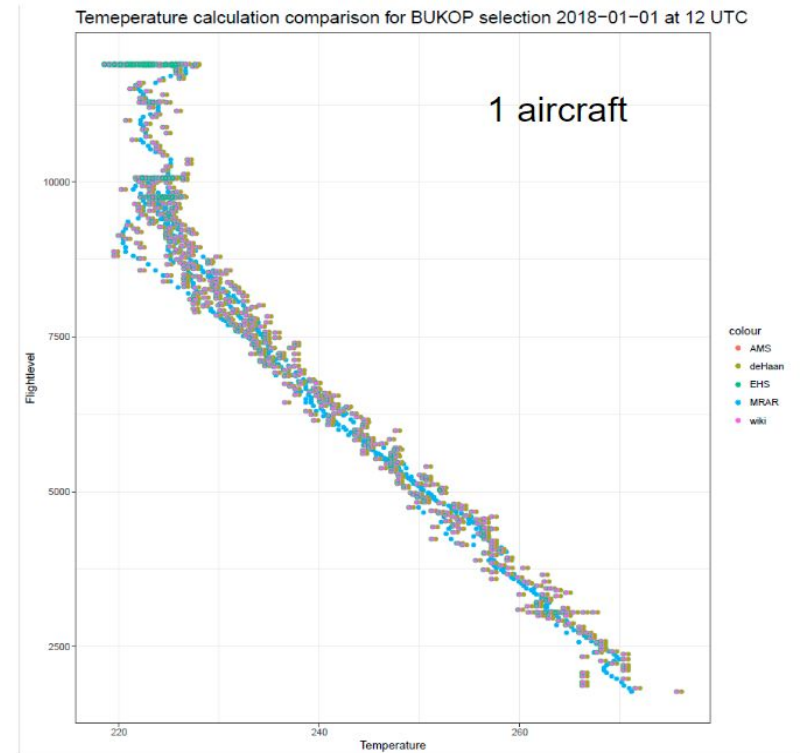
de Haan

$$T = 0,00248742955 \left(\frac{v_t}{M} \right)^2$$

AMS

$$T = 0,00248861854 \left(\frac{v_t}{M} \right)^2$$

wiki



- (deHaan) De Haan, S. (2009): Quality assessment of high resolution wind and temperature observations from Mode-S. KNMI Scientific report, DeBilt, The Netherlands [Retrieved 1 May 2019 from https://www.researchgate.net/publication/239592823_Quality_assessment_of_high_resolution_wind_and_temperature_observation_from_ModeS]
- (AMS) Stone, E.K. - Pearce, G. (2016): A network of Mode-S receivers for routine acquisition of aircraft-derived meteorological data , J. Atmos. Oceanic Technol., 33, 757–768 [Retrieved 27 May 2020 from <https://doi.org/10.1175/JTECH-D-15-0184.1>]
- (wiki) Slovak ATC, personal communication

Conclusions

- The bias and std of EHS measurements is significantly larger than for MRAR measurements while they both originate from the same aircraft at the same time and position. Not understood yet.
- EHS temperature calculation methods are equivalent and differ only in constant precision.

Thank you

for your attention