

Status and plans for whole range TA calibration

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Objective

- Use Ta obs and sim over Sky and Ocean and apply empirical linear adjustment to Tb to remove differences

=> Ta_model is computed using spillover-adjusted antenna pattern over Ocean and Cold Sky.

$$Ta_{new} = A Ta_{L2} + B$$

Find **A** and **B** so that

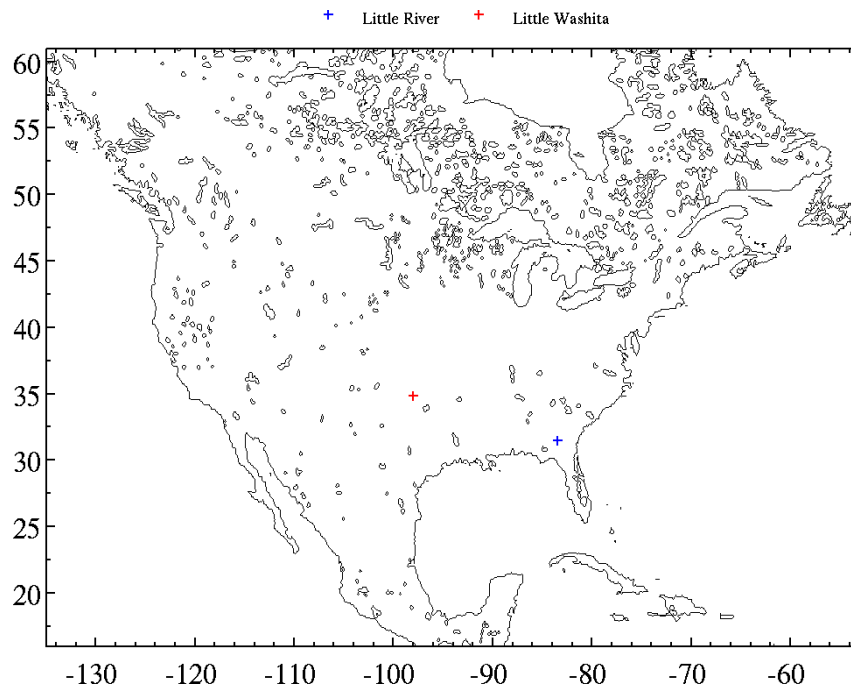
$$Ta_{new} = Ta_{model}$$

- Check adjustment over land reference site

Validation over land

2 instrumented USDA sites

- Little River (LR),
collocated with beam
2 only
- Little Washita (LW),
collocated with beam
3 only



Little River

- Use USDA measured temperature and SM at LR
 - T (USDA) is ~ 1.7 K warmer than T (NCEP) (in L2)
 - SM (USDA) is 0.2 dryer than SM (NCEP)
 - \Rightarrow Ta model is increased ~ 6 K by using USDA values
- Use of Hybrid gain pattern increases Ta by similar amount ~ 6 K

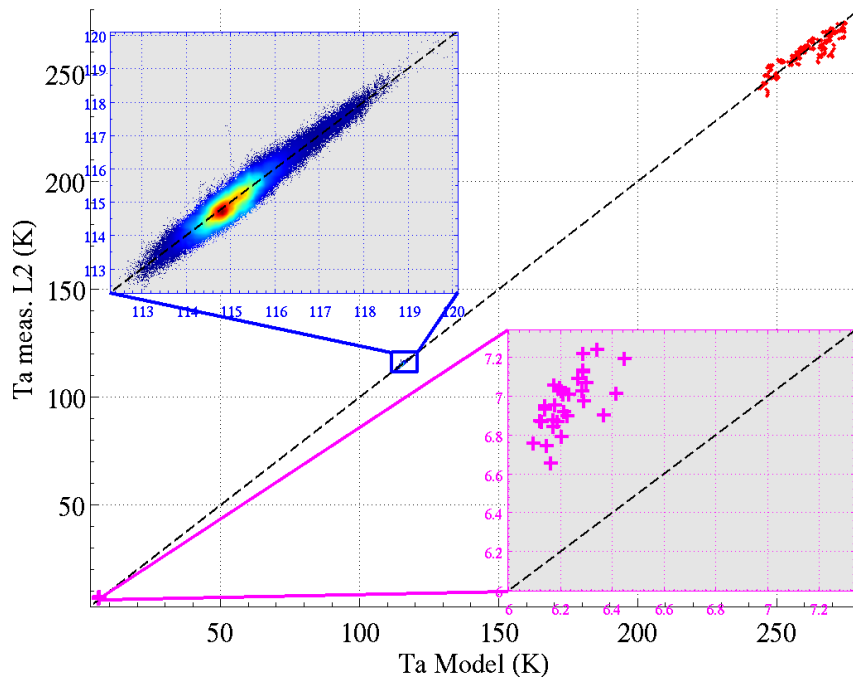
Little Washita

- Use USDA measured temperature and SM at LW
 - T (USDA) is ~ 1.4 K warmer than T (NCEP) (in L2)
 - SM (USDA) is 0.1 dryer than SM (NCEP)
 - \Rightarrow Ta model is increased ~ 4 K by using USDA values
- Use of Hybrid gain pattern increases Ta by ~ 5 K

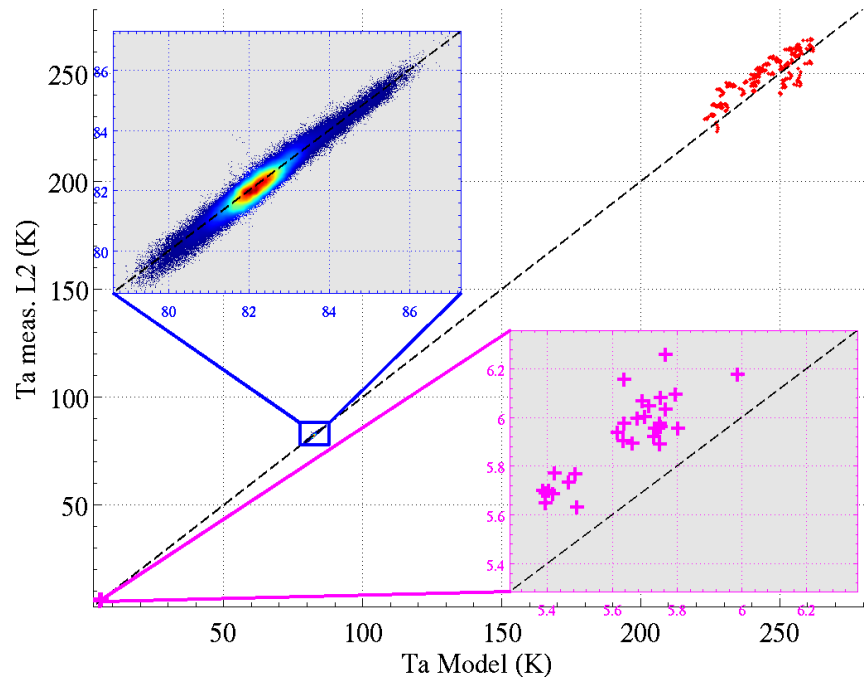
Calibration status in V4.5.1

Beam 2 (Little River)

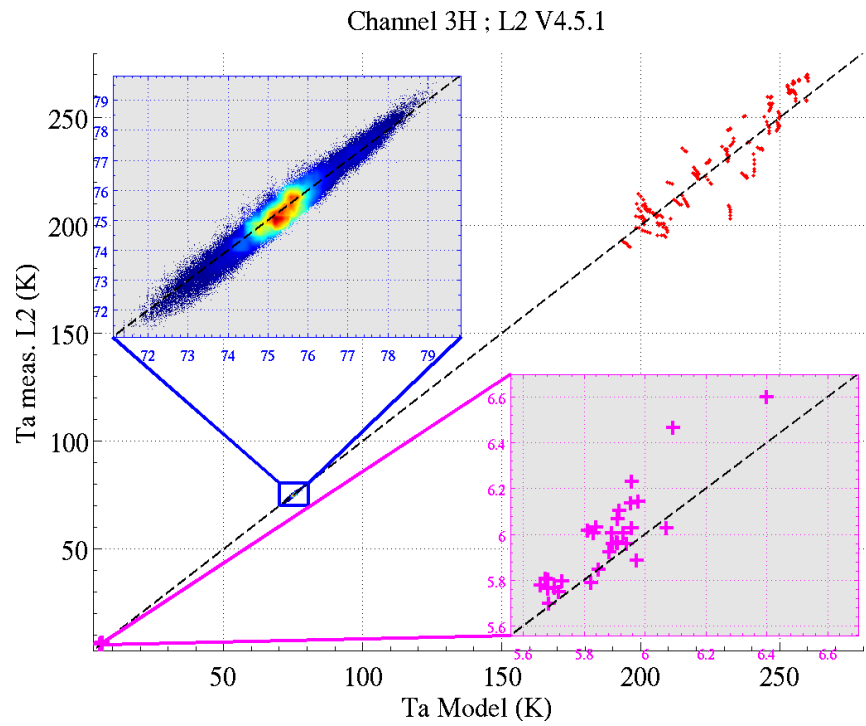
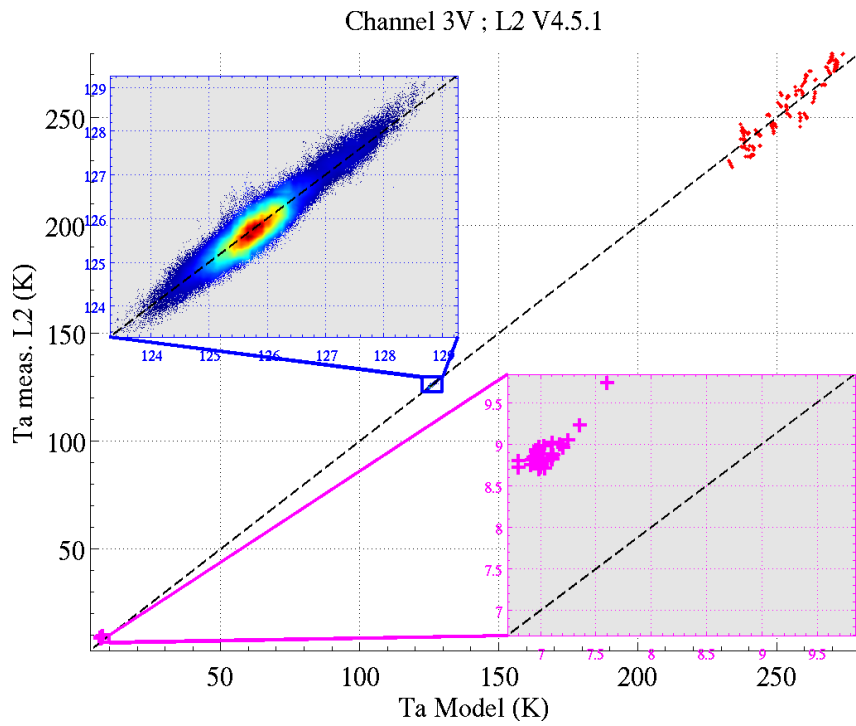
Channel 2V ; L2 V4.5.1



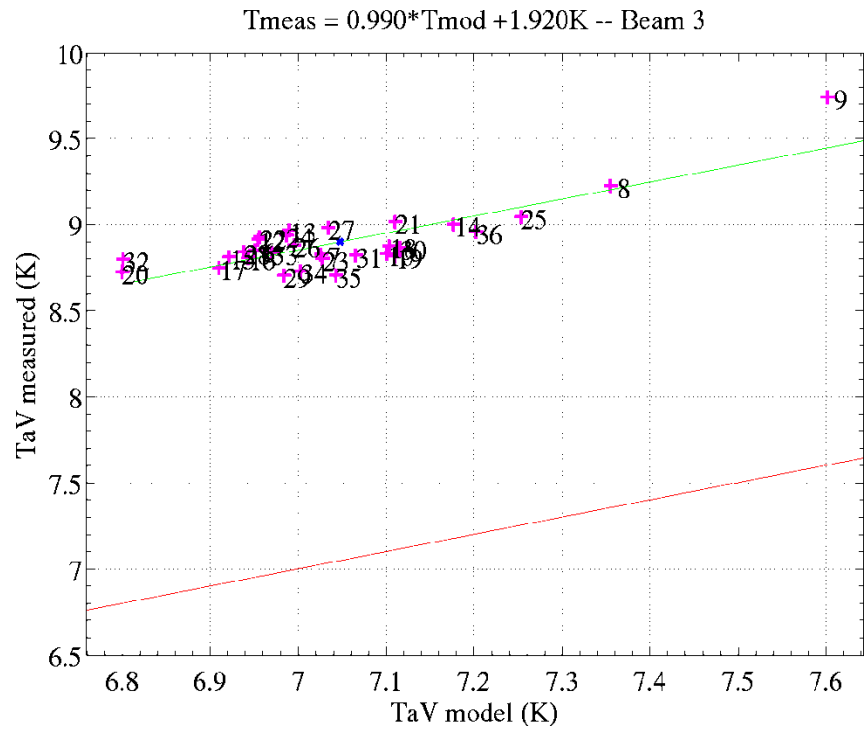
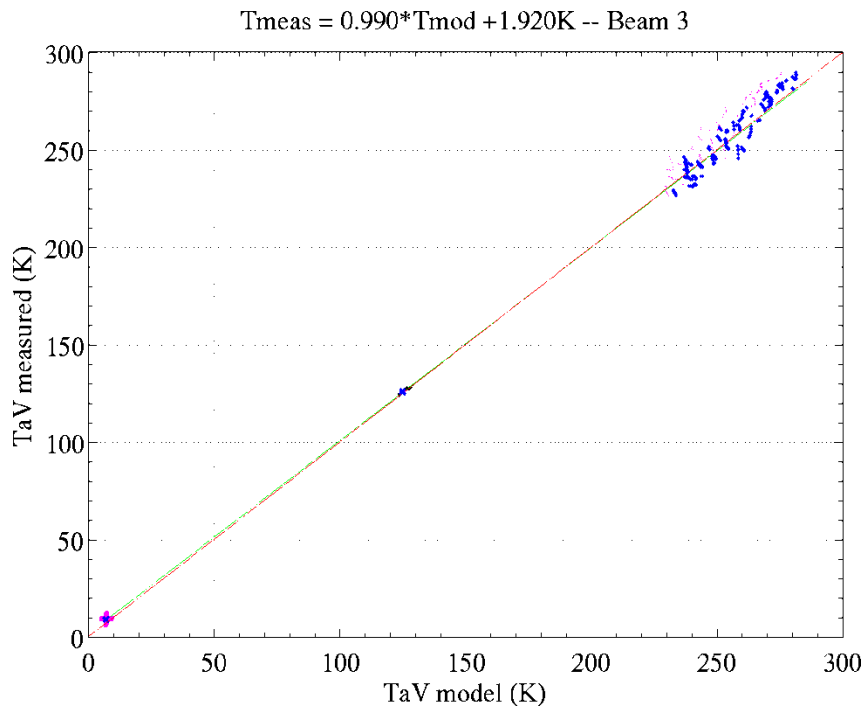
Channel 2H ; L2 V4.5.1



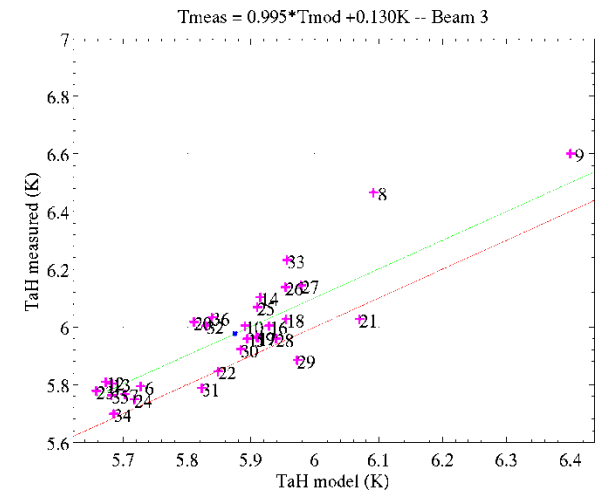
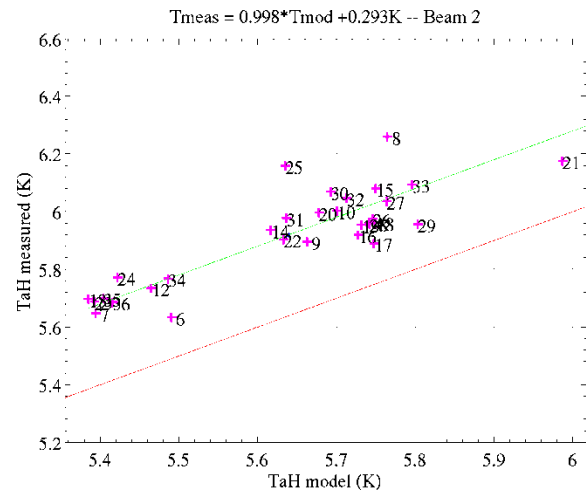
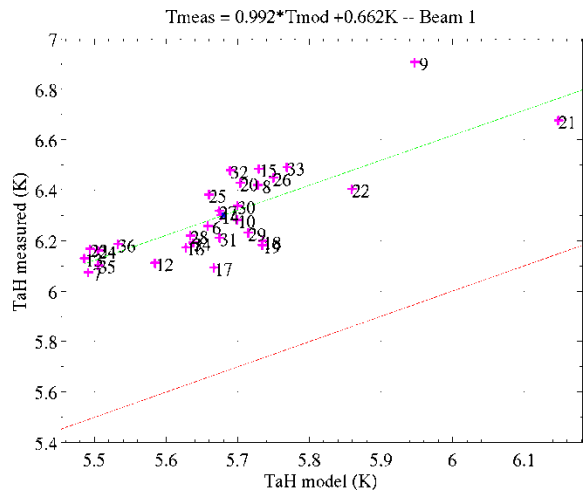
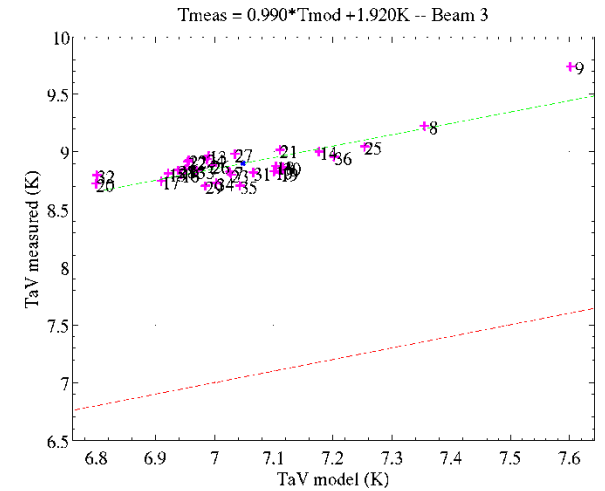
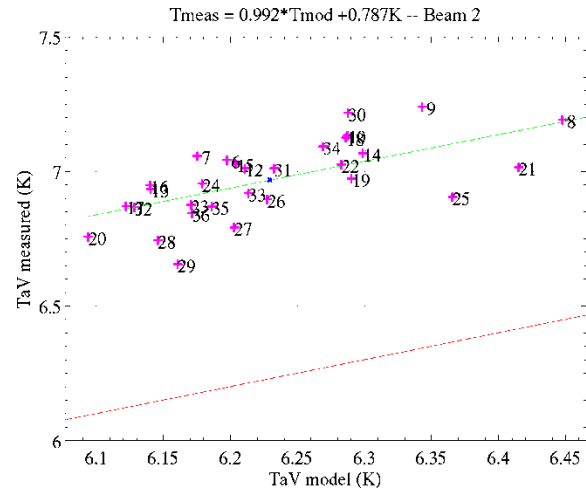
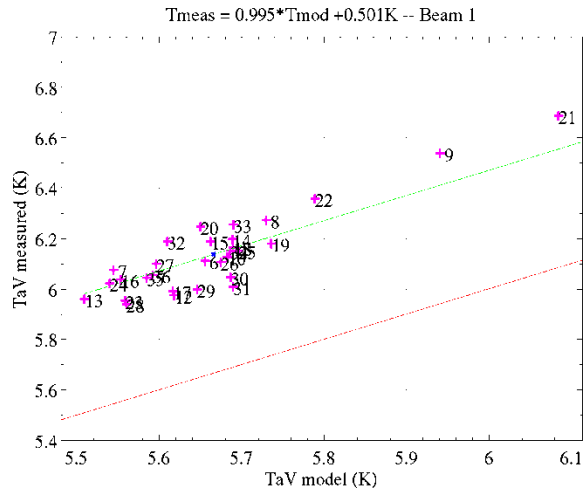
Beam 3 (Little Washita)



Empirical Adjustment Beam 3 V-pol

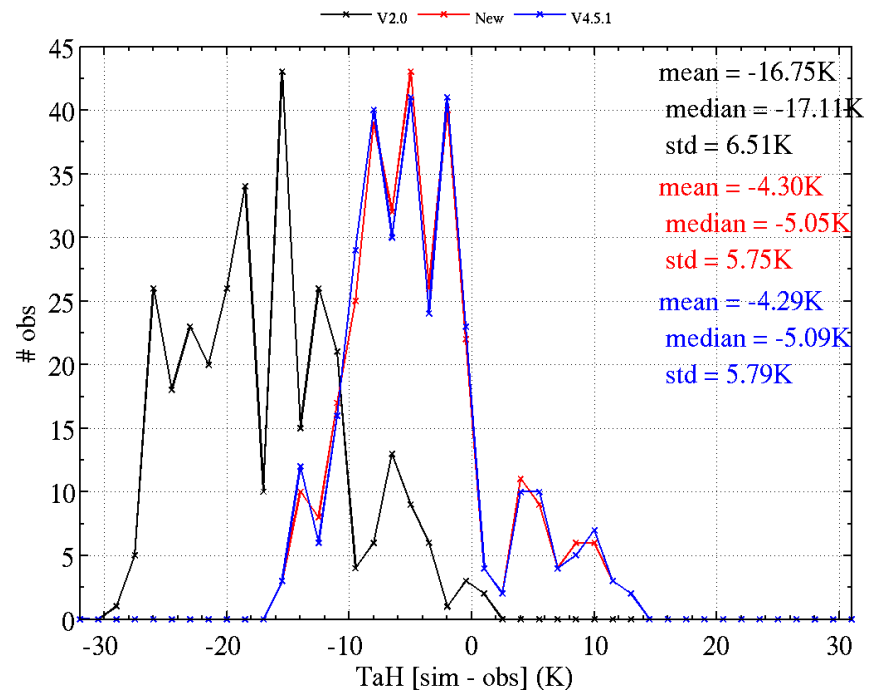
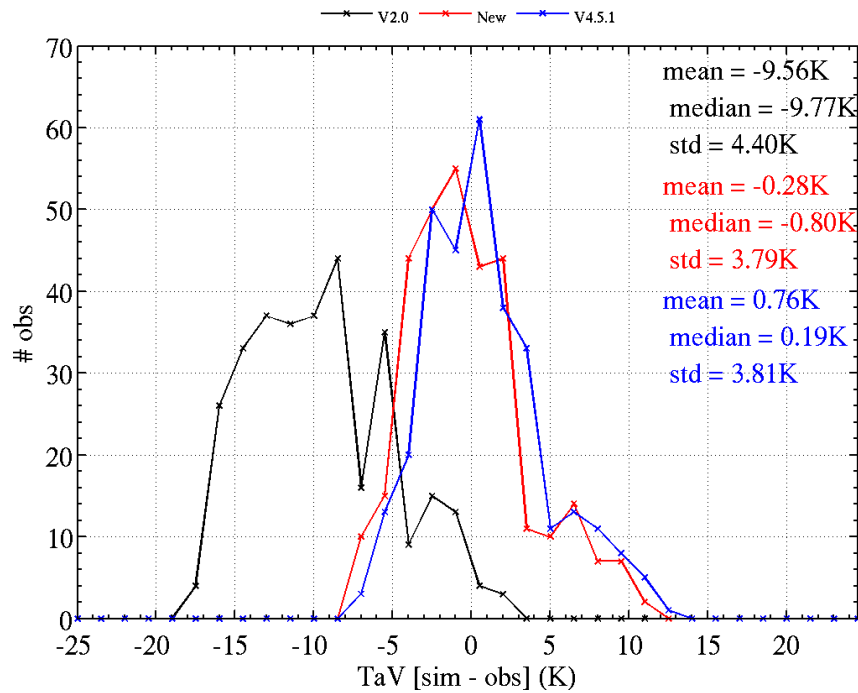


All channels CS bias , slopes & offset



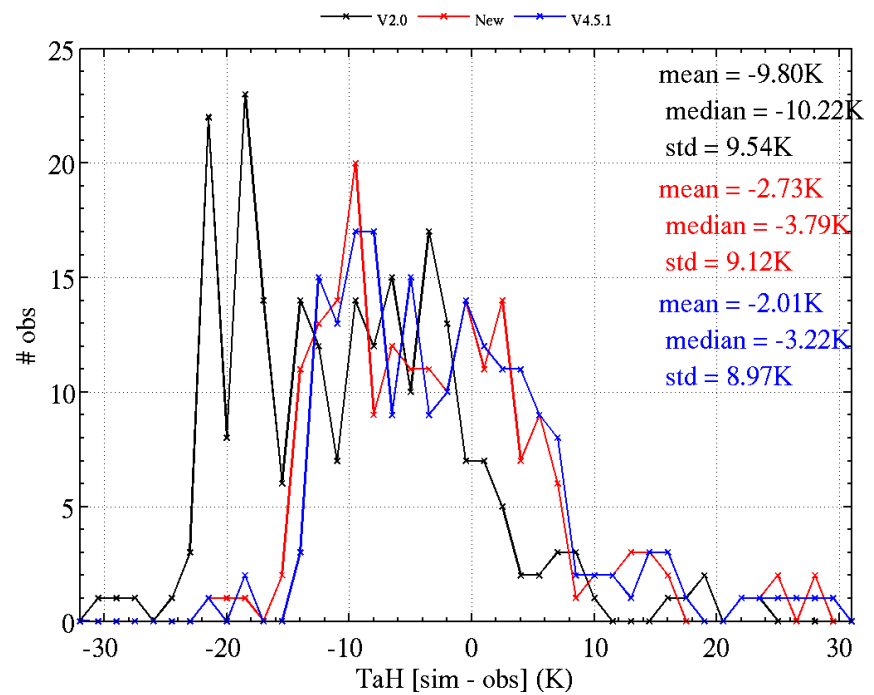
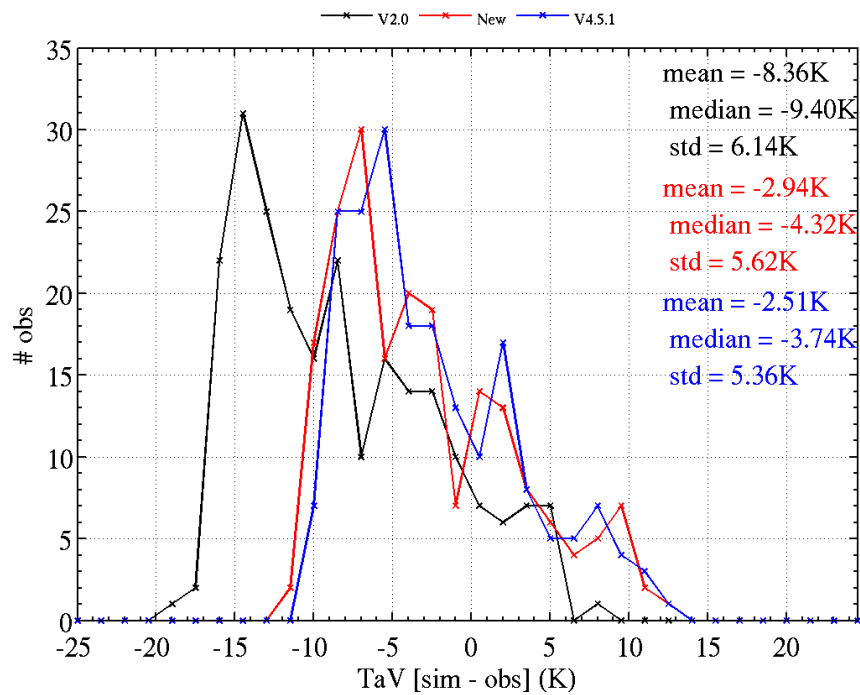
Histogram Ta obs – sims

Little River , Beam 2



Histogram Ta obs – sim

Little Washita , Beam 3



Future work

- Add land validation sites
 - Needed for beam 1 (no site for now)
 - To increase independent validations
- => Collocations of Aquarius footprints and SMAP calibration sites have been computed.
- TO DO: acquire in situ data.
- Reduce scatter over land: QC -> filter data likely to have model issues (e.g. high VWC)
 - Impact on ocean part (slope) in TB & retrieve SSS ?
(changes in empirical corrections ?)
 - Update all to latest antenna pattern, calibrated product
- ...