

Snow CCI SWE / GlobSnow algorithm improvements

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Overview

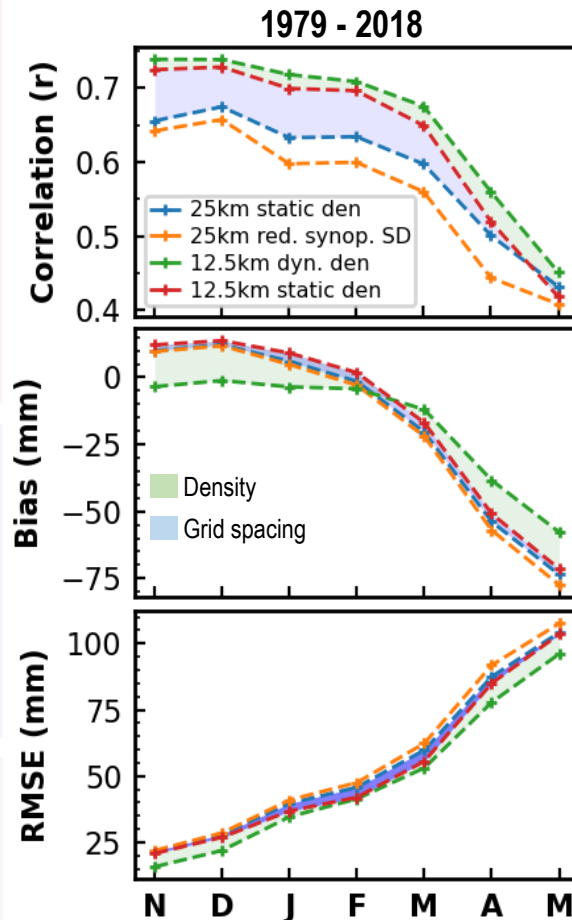
- CCI SWE /GlobSnow v3 combines passive microwave satellite data and in situ snow depth information to estimate snow water equivalent (SWE)
- We produced a suite of SWE four products to systematically evaluate three proposed changes to the CCI SWE processing scheme.
- Accuracy versus in situ snow course data; inter-comparison of climatology and trends. 1979-2018.
- Results will inform the algorithm enhancements applied in the final CCI SWE product.

Algorithm changes

- Reduced **grid spacing**: 25km to 12.5km
- Snow depth** data from weather stations: enhanced temporal filter over 1979 – 2018 period.
- Snow density** parameterization: change from static snow density (0.24 kg m⁻²) to spatially and temporally varying snow density.

Findings

- Snow density change had largest impact on SWE retrieval.
- Step-wise RMSE improvement for each of grid spacing and snow density.
- Reducing the synoptic snow depth input to improve temporal consistency negatively affected the spatial distribution of the data and degraded retrieval performance.



Performance change for each algorithm modification

	Grid spacing	In situ SD	Snow density	Grid spacing + snow density
Bias (mm)	3.06	-1.55	-2.9	0.77
Absolute bias (mm)	1.98	-1.36	3.32	5.30
RMSE (mm)	-3.10	2.34	-3.12	-6.24
RMSE % of observed SWE	-3.27%	+2.47%	-3.31%	-6.59%
Correlation (r)	0.04	-0.04	0.06	1.0

