Impact of SMAP on quantitative precipitation forecasts from ECCC's short-range system

Stéphane Bélair
Marco L. Carrera
Maria Abrahamowicz
Nasim Alavi
Bernard Bilodeau

Environment and Climate Change Canada (ECCC)

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CaLDAS (for surface temperature and soil moisture)

Assimilation of SMAP / SMOS brightness temperature, surface temperature retrievals from GOES / CRIS / AIRS / IASI, and screen-level observations.

New land surface scheme for the first guess (SVS instead of ISBA).

Based on Ensemble Kalman Filter, 24 members

Two target configuations: North America at 2.5-km grid spacing, and global at 25-km (or less) grid spacing.

Test currently done on an intermediate grid, i.e., 10-km grid spacing over North America

Summary of the impact of SMAP on NWP forecasts – short-range prediction system

Near-surface meteorology: warmer and drier than operational configuration, worse STDEs, especially for humidity

Upper-air evaluation: Mix of positive and negative (more negative)

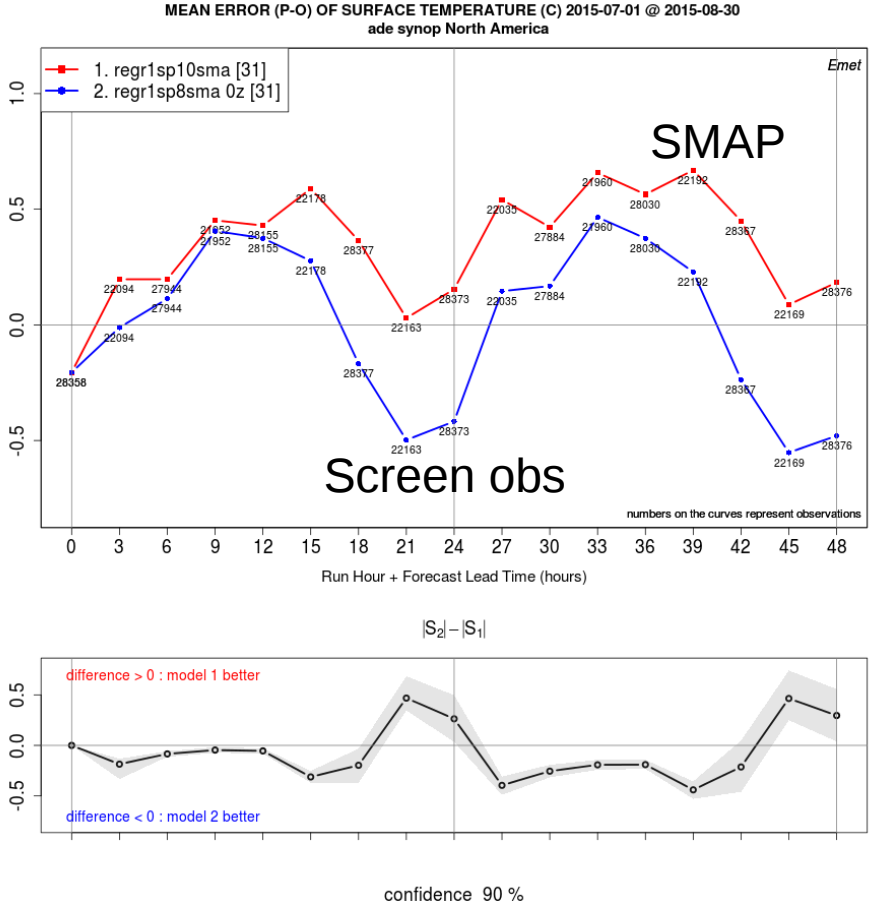
Precipitation: Much better bias, improvement of skill scores for summertime evening precipitation.

Results shown in the next few slides

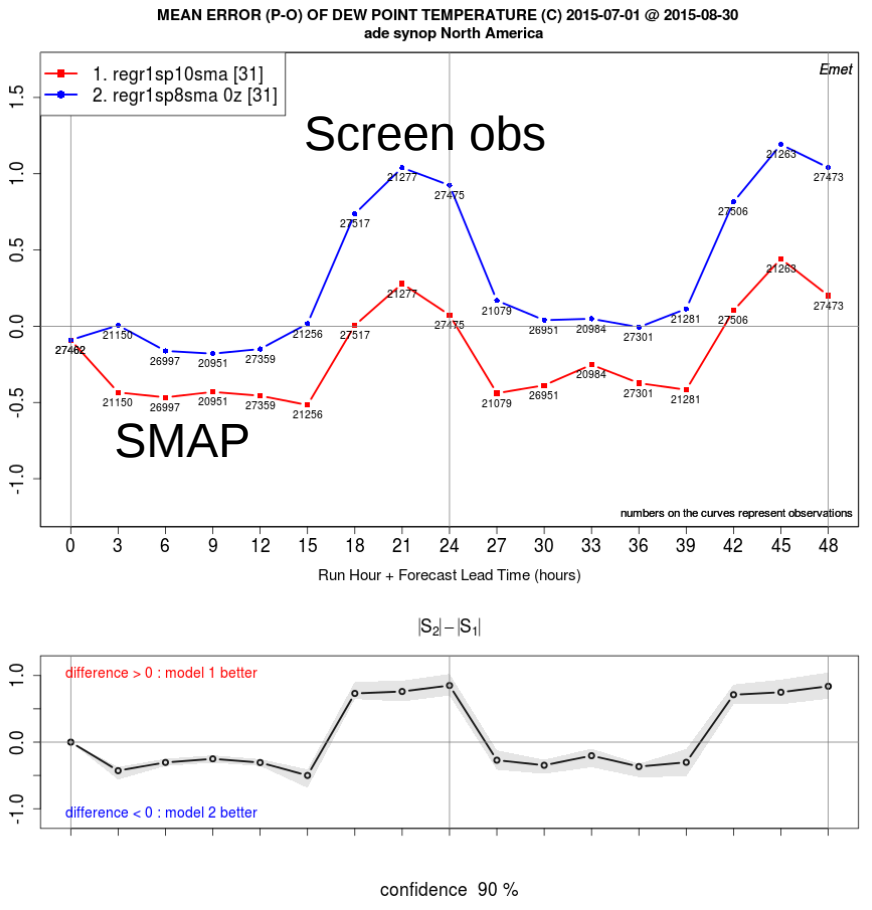
Impact of SMAP on Weather Forecasts

Bias

Air temperature (2m)

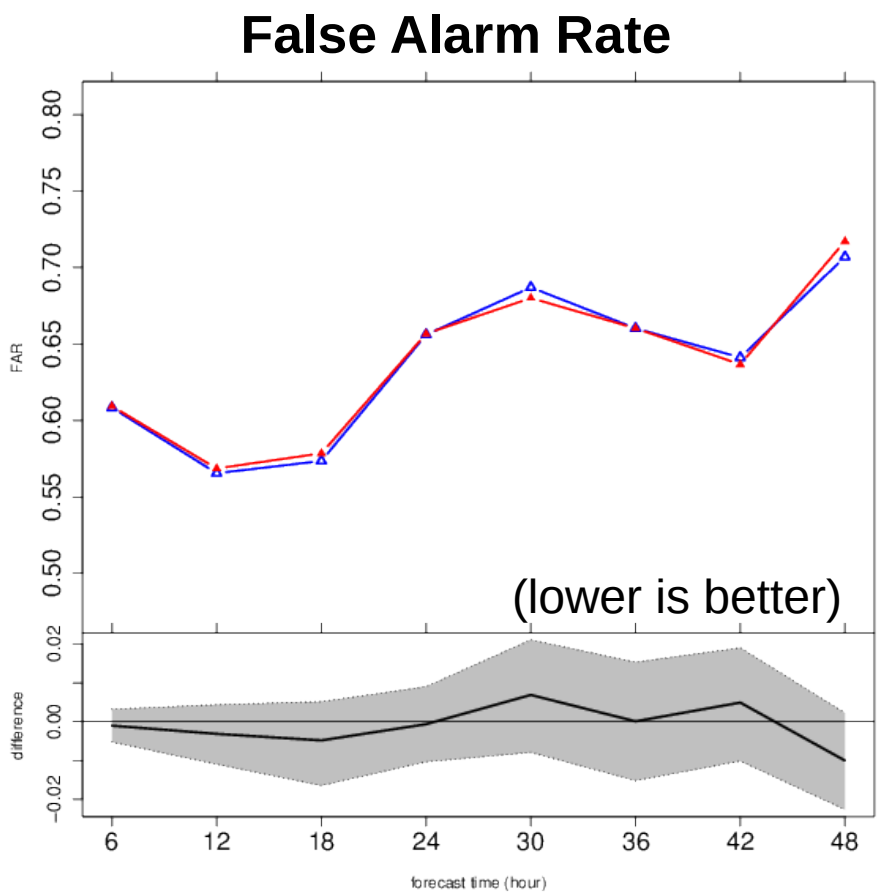


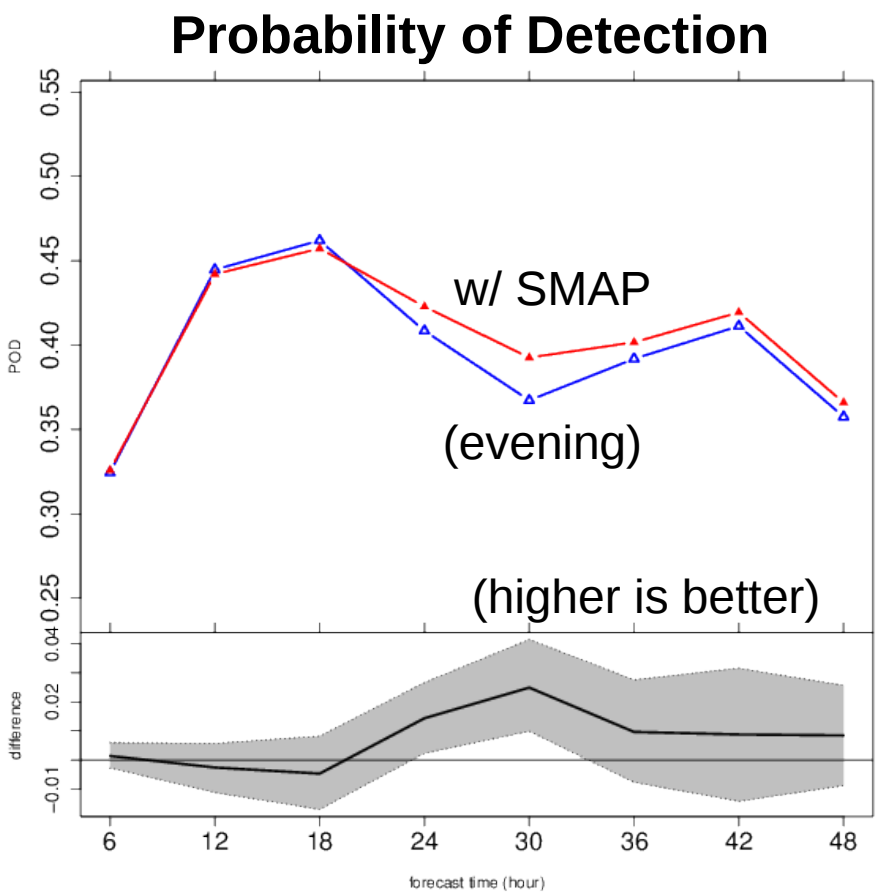
Dew point temp. (2m)



July and August 2015
North America
(62 cases, 0000 UTC)

Impact of SMAP on Precipitation forecasts



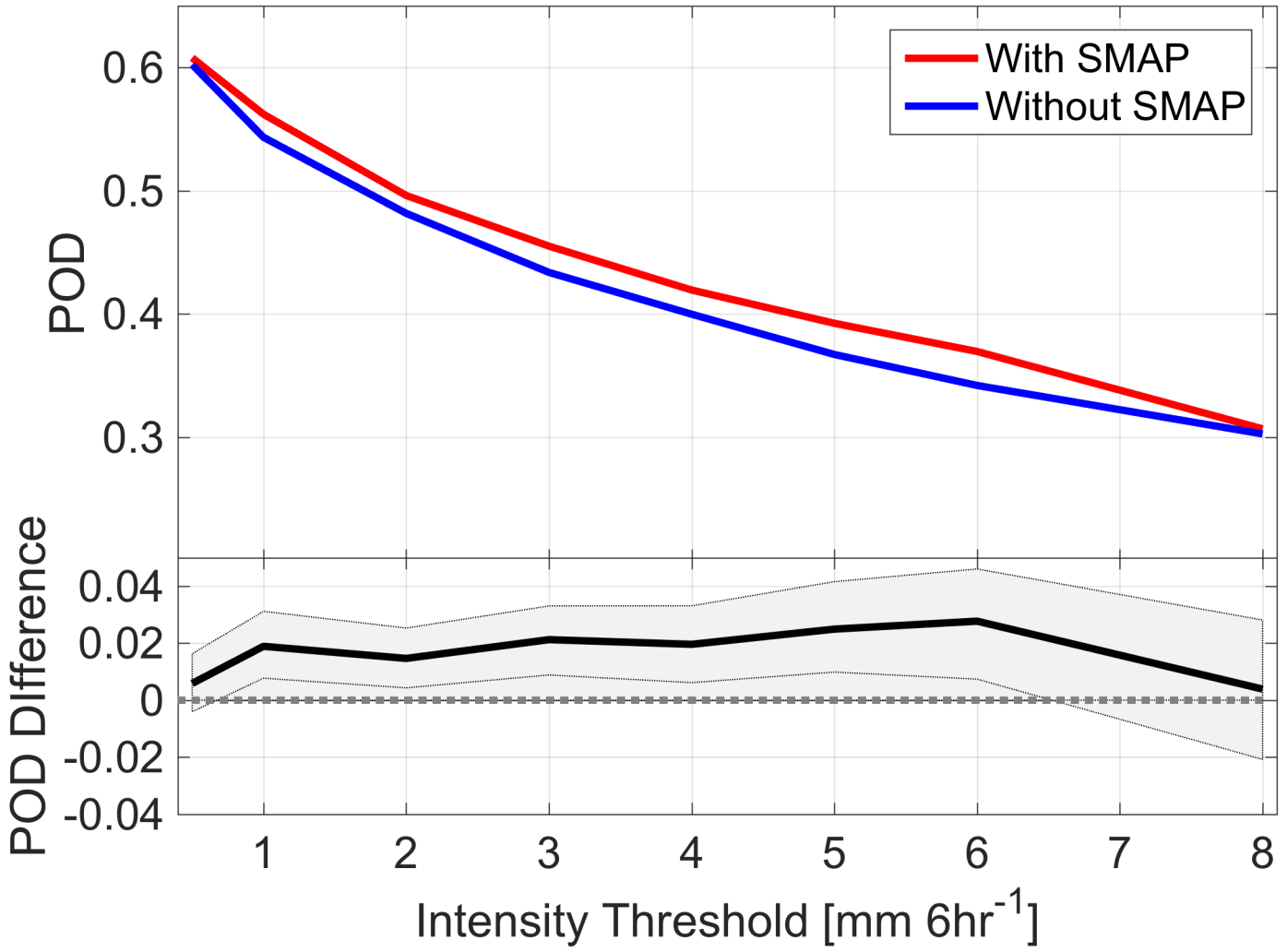


Valid over North America

For July-August 2015

(62 cases, 0000 UTC)

Impact of SMAP on Precipitation forecasts (for 30h forecasts, valid at 06Z the next day)



Valid over North America

For July-August 2015

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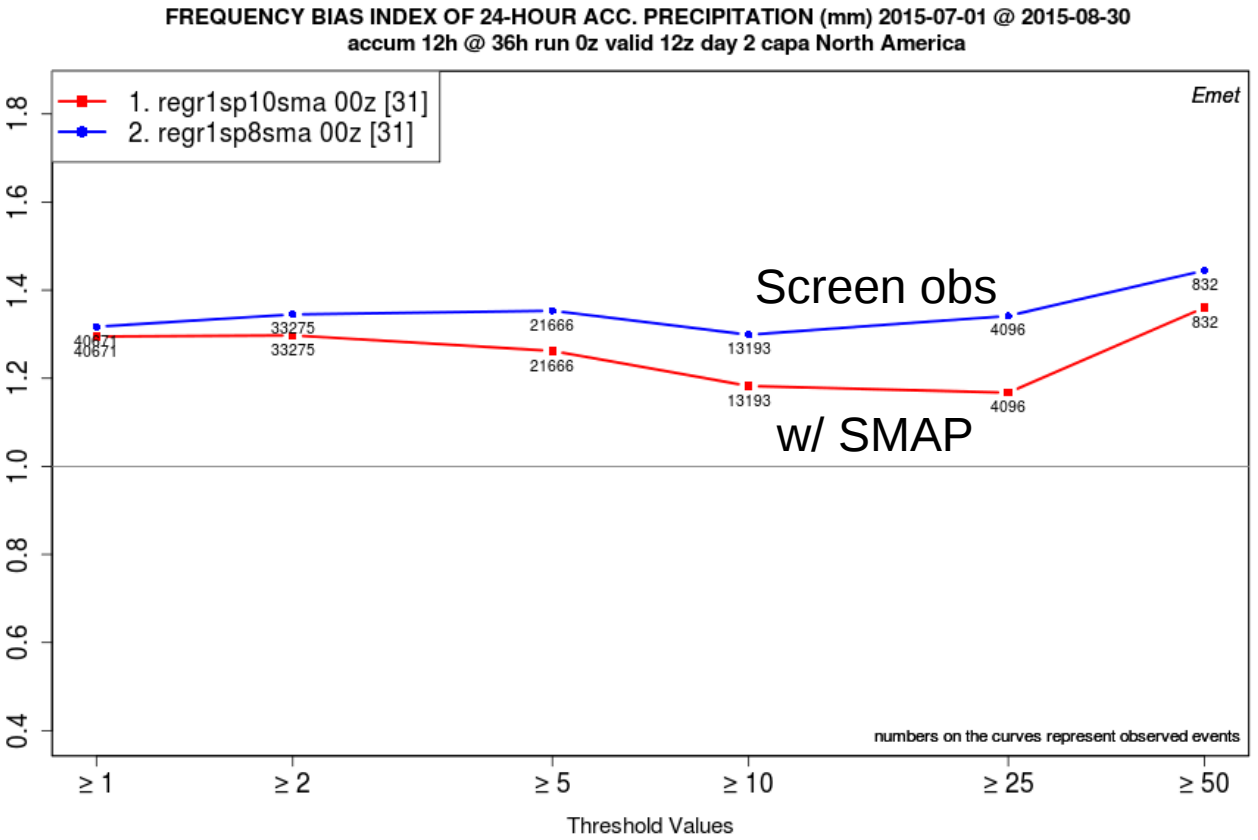
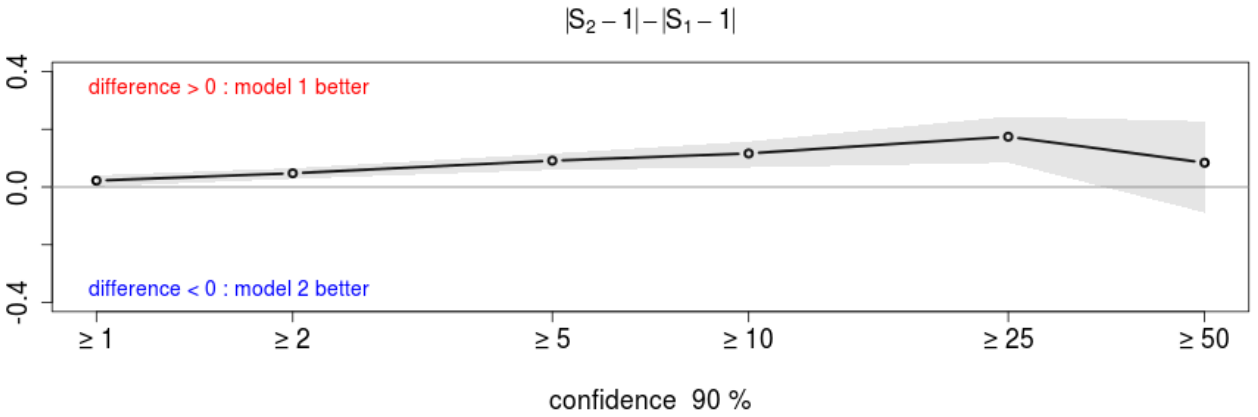
Impact of SMAP on Precipitation forecasts

Frequency bias
24-h precipitation
12 to 36-h
Valid over North America

For July-August 2015





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Ongoing…

Bias-correction is a problem… currently testing without any correction (seems to lead to better impact on NWP)

Soil moisture analyses still a bit noisy, which is a problem for NWP… tests ongoing with smoother Tbs on the target analysis grid

Now getting ready for tests in global medium-range forecasting system – for which to expect to have a greater impact of SMAP