

Total Precipitable Water over Land (1/2)

Algorithm Developer

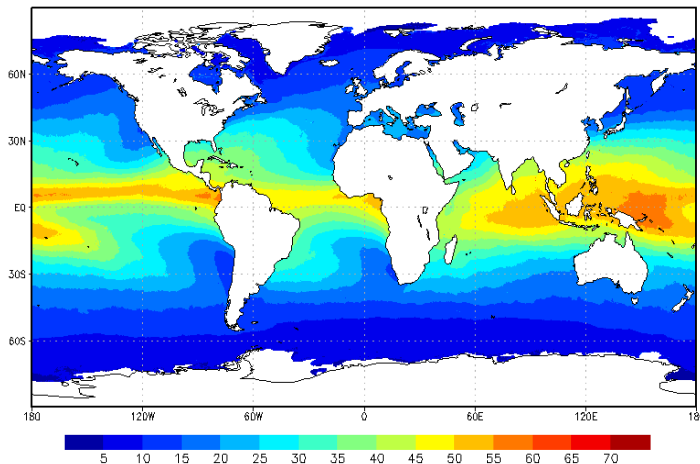
Masahiro Kazumori (Japan Meteorological Agency)

Algorithm Overview

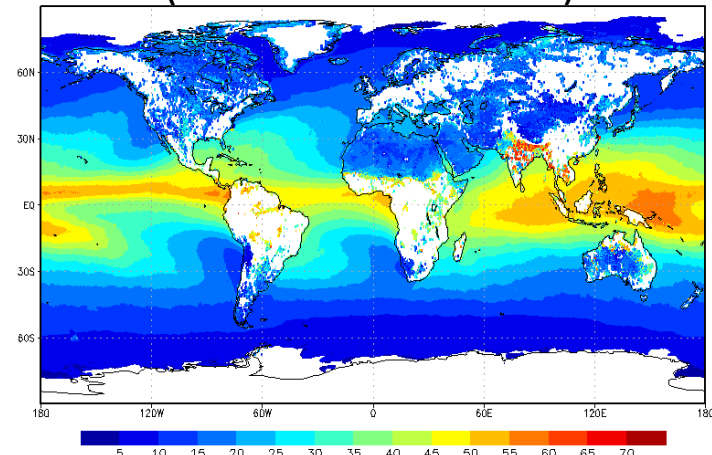
Estimation of vertically-integrated column water vapor (total precipitable water: TPW) over land using polarization differences of 18 and 23 GHz channels, respectively.

TPW over ocean is currently provided as AMSR2 standard product, but this research product will provide TPW over land (PWL) except vegetation and snow/ice regions.

TPW over ocean (standard)



TPW over ocean & land
(standard + research)



Total Precipitable Water over Land (2/2)

Validation

- Validation is done by using global radio sonde network and ground-based GPS receiver, same as validation of TPW over ocean.
- Calculate the root mean square error (RMSE) of AMSR2 TPW over land compared with following “ground truth” data;
 - ✓ TPW by radio sonde observations within 6-hour time differences and 30-km distances; and
 - ✓ TPW by GPS receivers within 5-minute time differences and 30-km distances.

Goal Accuracy

- 6.5kg/m² as RMSE of global TPW over land; same quality to previous results for AMSR-E by Deeter (2007).

Reference

- M. Kazumori and M. Kachi, 2018: Precipitable Water Vapor Retrieval over Land from GCOM-W/AMSR2. *Trans. JSASS Aerospace Tech. Japan*, **16**, 143-146.

Validation Results (VS GPS)

Matchup condition with GPS receivers

Time difference: ≤ 5 -minute

Distance: ≤ 30 -km

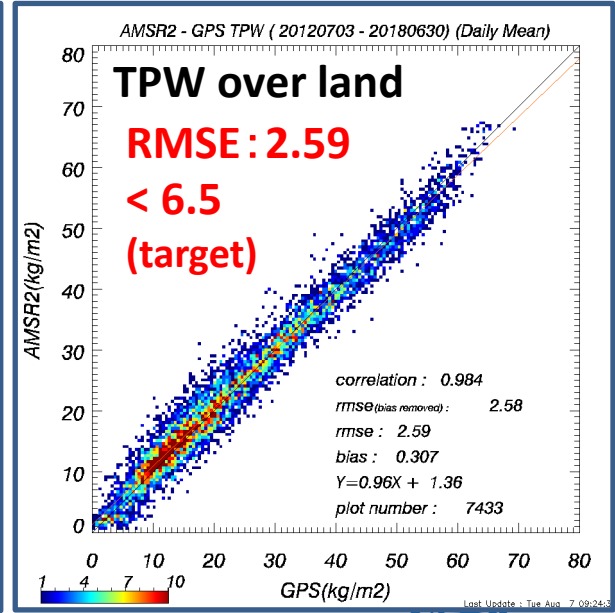
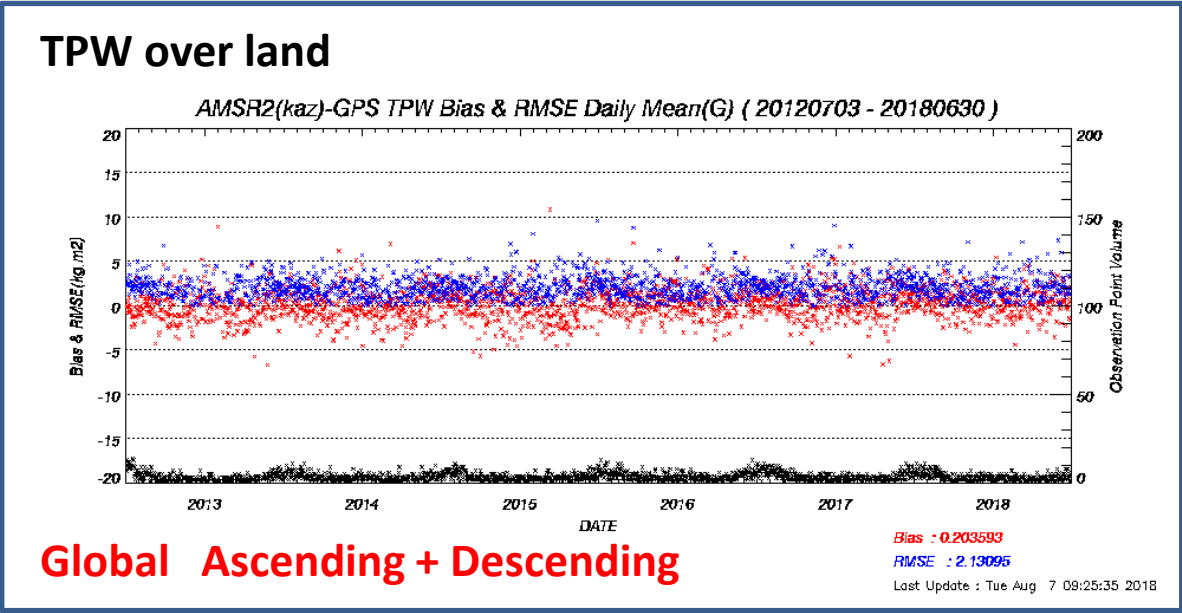
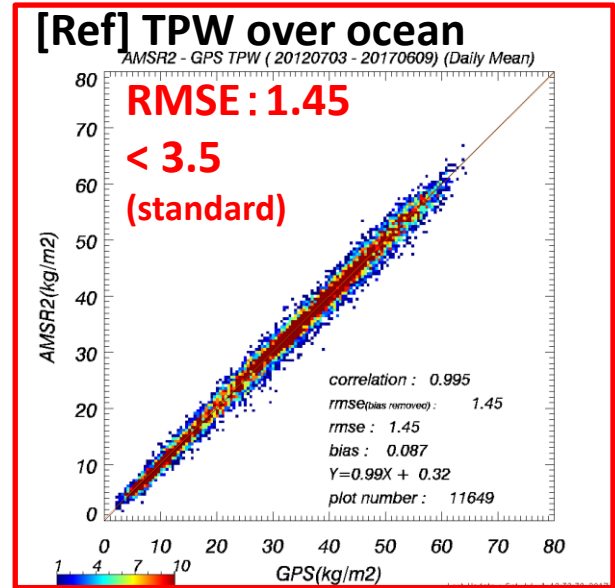
QC: 0 only

Satellite TPW: max-min ≤ 5

Data number: Satellite data exists more than 5 pixels with above condition

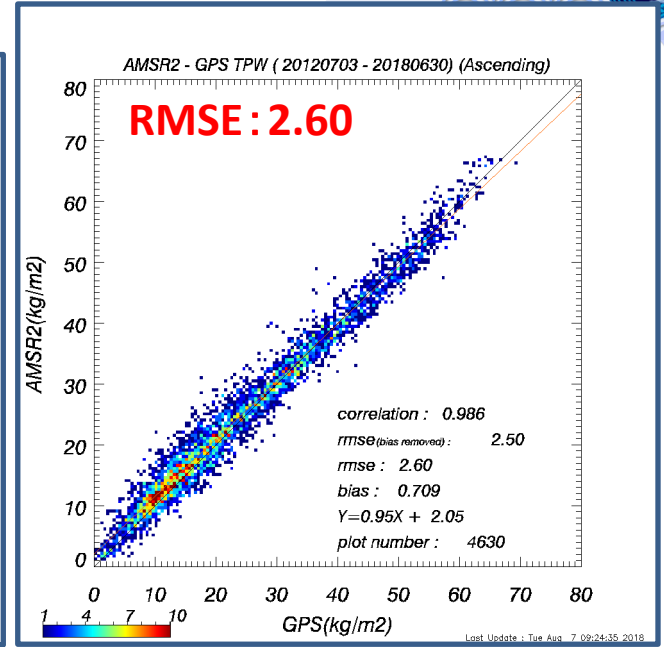
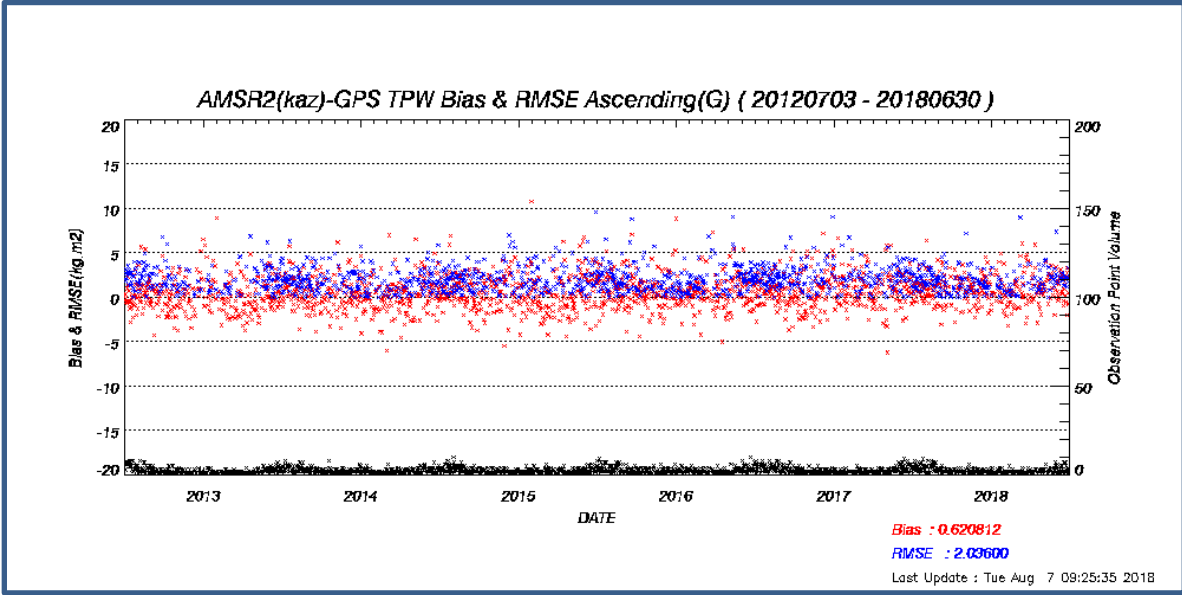
Period: from July 2, 2012 to June 30, 2018

GPS orbit/time data: GSI (Geospatial Information Authority of Japan)

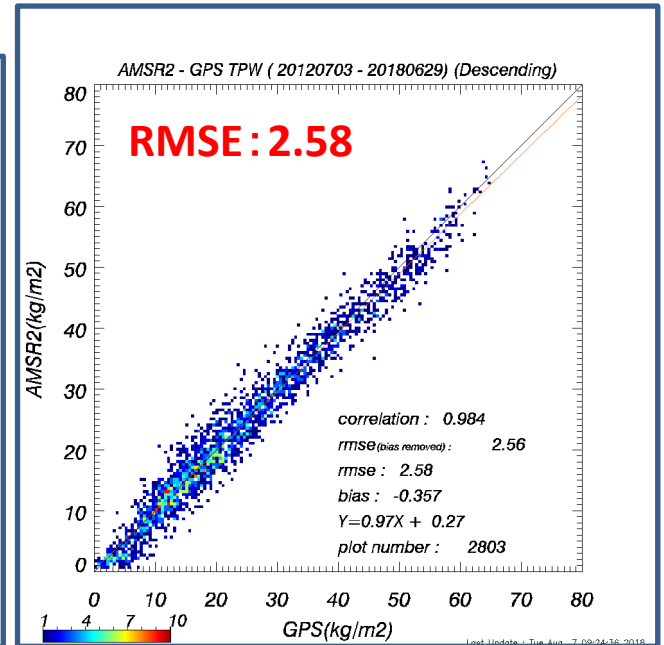
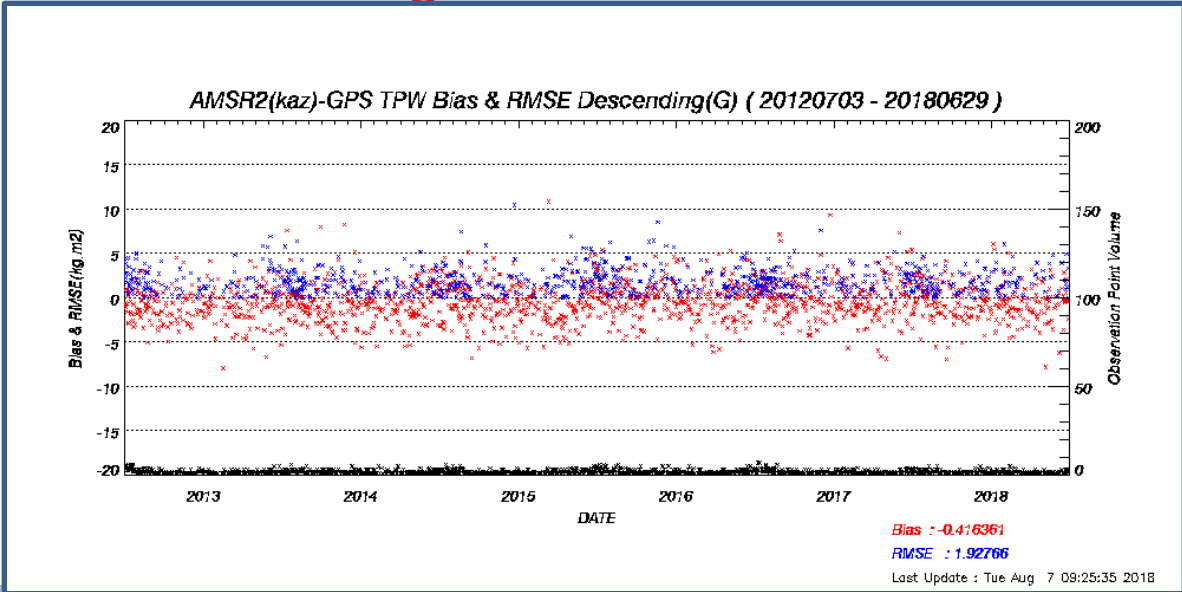


Global Ascending

TPW over land



Global Descending



Validation Results (VS Sonde)

Matchup condition with radiosondes

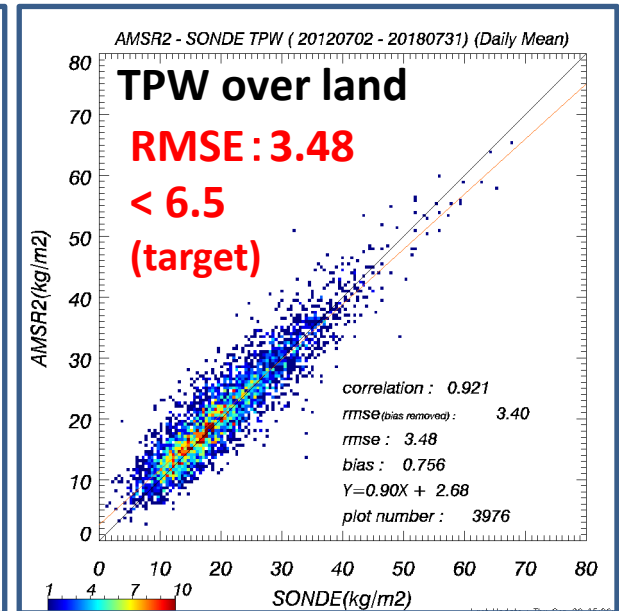
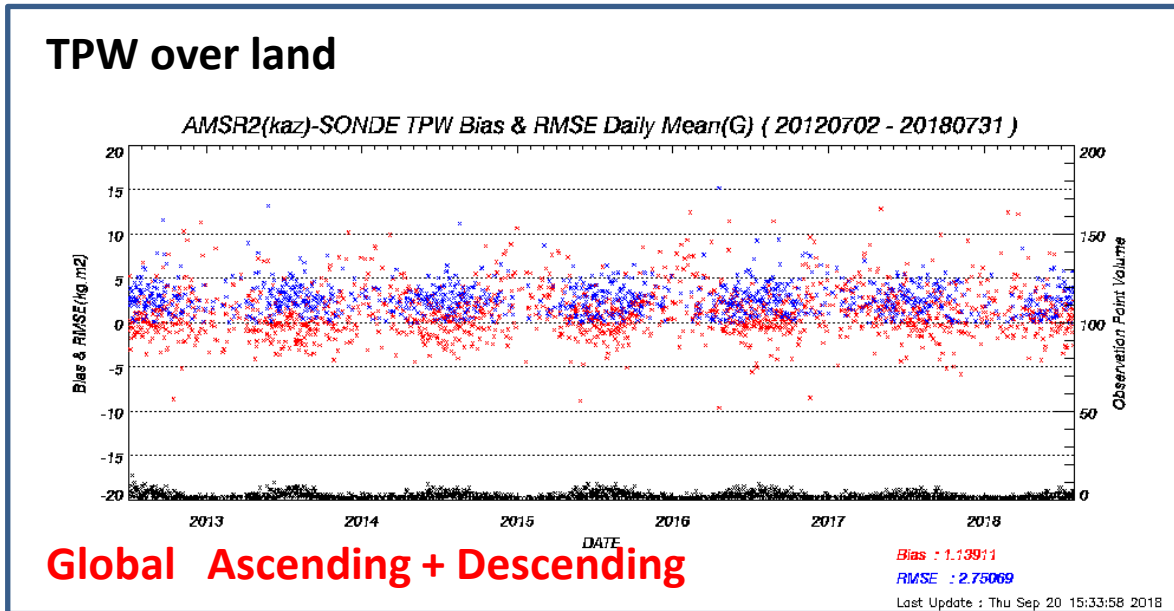
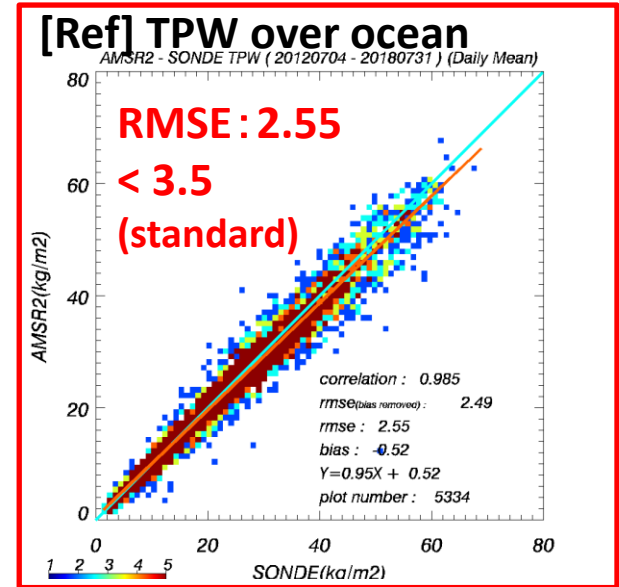
Time difference: ≤ 1 -hour

Distance: ≤ 30 -km

Satellite TPW: max-min ≤ 5

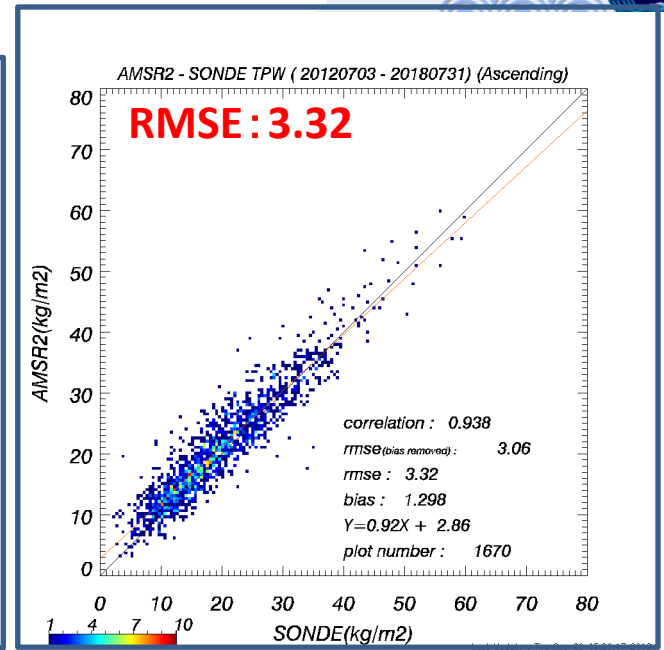
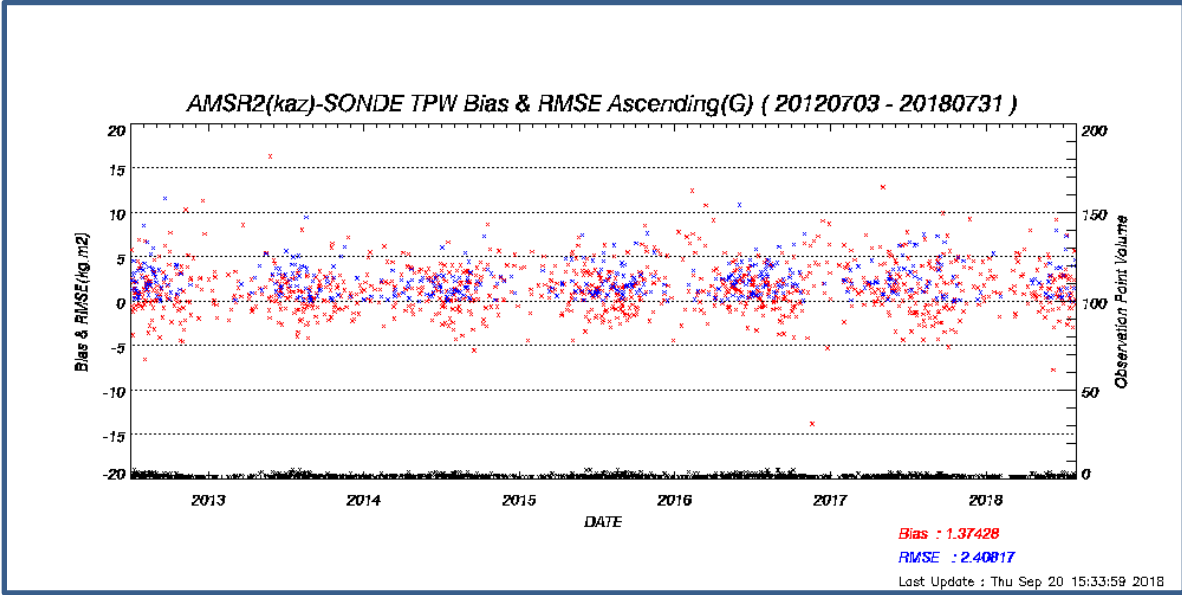
Data number: Satellite data exists more than 5 pixels with above condition

Period: from July 2, 2012 to July 31, 2018



Global Ascending

TPW over land



Global Descending

