

AMSR2 Research Product (Land Surface Temperature) Validation Results

Japan Aerospace Exploration Agency (JAXA),
Earth Observation Research Center (EORC)

Remote Sensing Technology Center of Japan (RESTEC)

Land surface temperature

- **Algorithm developer**

Tom Jackson (USDA)

- **Algorithm overview**

Retrieval of LST by single equation using 36 GHz V T_B

The equation is obtained by linear regression like:

$$T = 1.11 T_{B,37V} - 15.2$$

using AMSR2 LST and LST at the ground observation sites in Europe and US.

- **Retrieval requirements**

open water within 5% in a pixel / no freezing / no snow

- **Goal accuracy**

RMSE within **3K for forest areas and**

4K for low vegetation areas

Validation

1. Addition of the **VALID** ground observation sites distributing globally

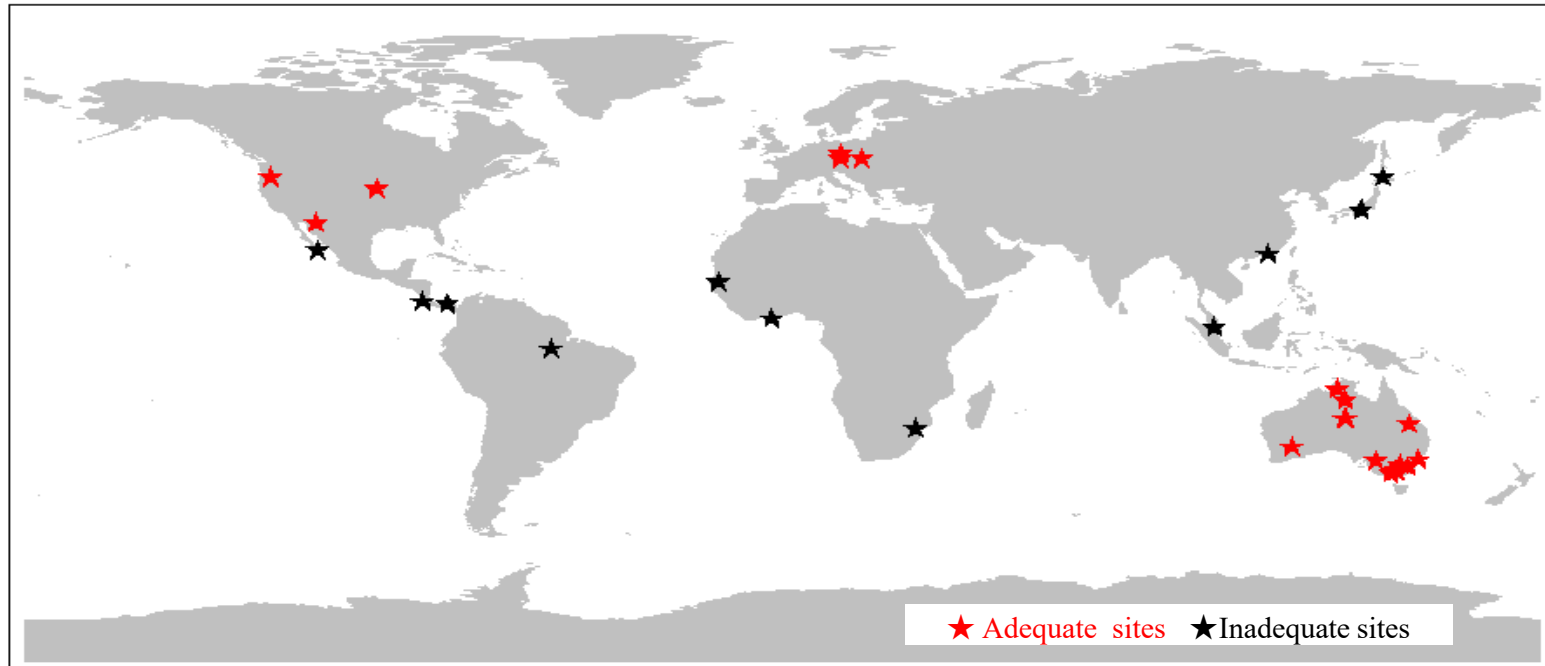
We chosed the ground observation sites registered at FLUXNET whose validation results with MODIS LST products met the goal accuracies (i.e., RMSE within 3K for forest areas and 4K for low vegetation areas).

See the next page. Adequate sites are indicated by ★.

2. Comparison between **AMSR2 LST** and the ground LST

- Temporal difference within 15 minutes
- Spatial difference within 5 km

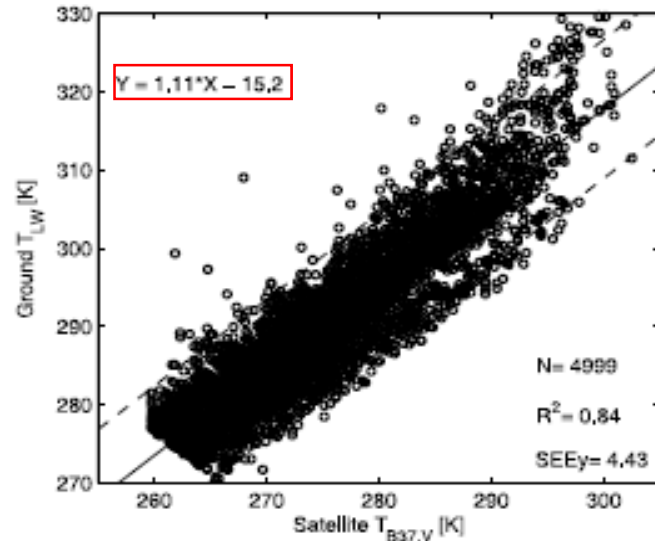
3. Update of the linear regression equation



Area	Site-ID	Period	Vegetation IGBP	Inadequate because ...
S. America	Brazil	BR-Sa3	EBF (Evergreen Broadleaf Forests)	No obs. period was overlapped
S. America	Panama	PA-SPs	GRA (Grasslands)	No obs. period was overlapped
S. America	Panama	PA-Bar	EBF (Evergreen Broadleaf Forests)	No OLR (LW_OUT) observation
S. America	Mexico	MX-Lpa	OSH (Open Shrublands)	No obs. period was overlapped
S. America	Costa Rica	CR-Nmr	CRO (Croplands)	No OLR (LW_OUT) observation
Asia	Japan	JP-MBF	DBF (Deciduous Broadleaf Forests)	No obs. period was overlapped
Asia	Japan	JP_SMF	MF (Mixed Forests)	No obs. period was overlapped
Asia	Malaysia	MY_PSO	EBF (Evergreen Broadleaf Forests)	No obs. period was overlapped
Asia	China	CN_Din	EBF (Evergreen Broadleaf Forests)	No obs. period was overlapped
Africa	Ghana	GH-Ank	EBF (Evergreen Broadleaf Forests)	Water area more than 5%
Africa	Senegal	SN-Dhr	SAV (Savannas)	No OLR (LW_OUT) observation
Africa	Mozambique	ZA-Kru	SAV (Savannas)	No OLR (LW_OUT) observation

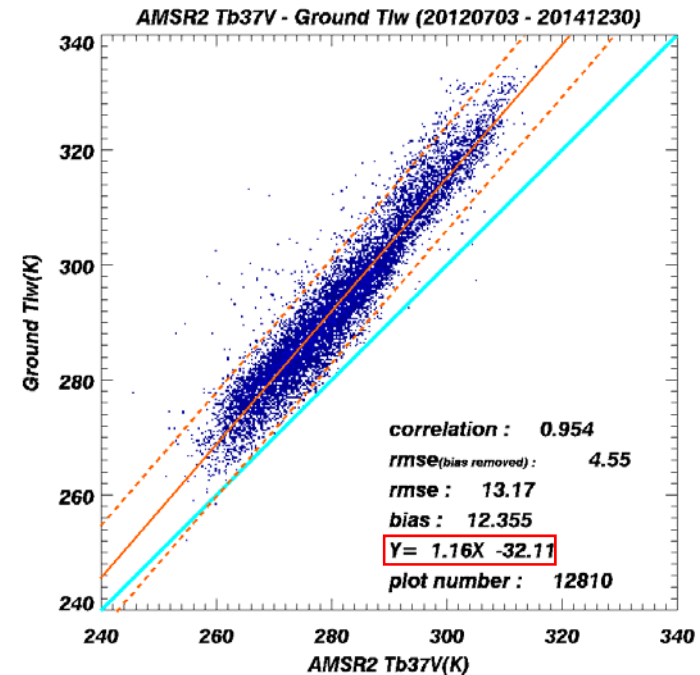
Update the linear regression equation

$$T = 1.11 T_{B,37V} - 15.2$$



Holmes *et al.*, *JGR* (2009)

$$T = 1.16 T_{B,37V} - 32.11$$

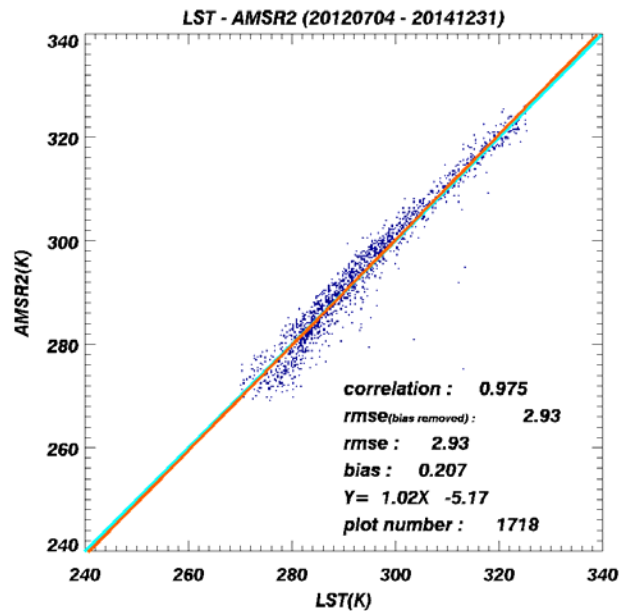


Last Update : Thu Nov 9 14:08:30 :

Validation results

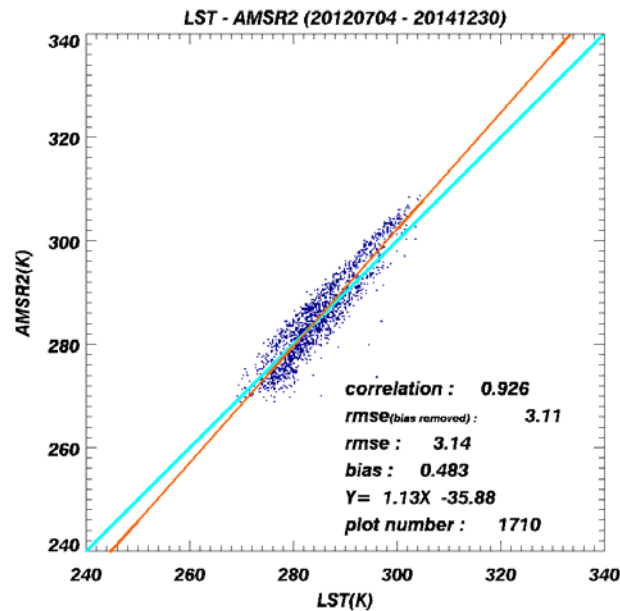
- For forest areas

Ascending



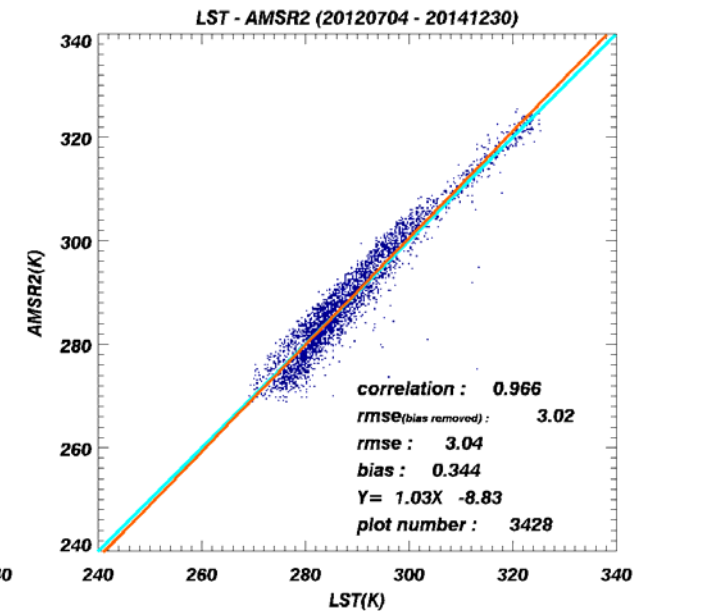
RMSE 2.93K

Descending



RMSE 3.14K

Ascending + Descending

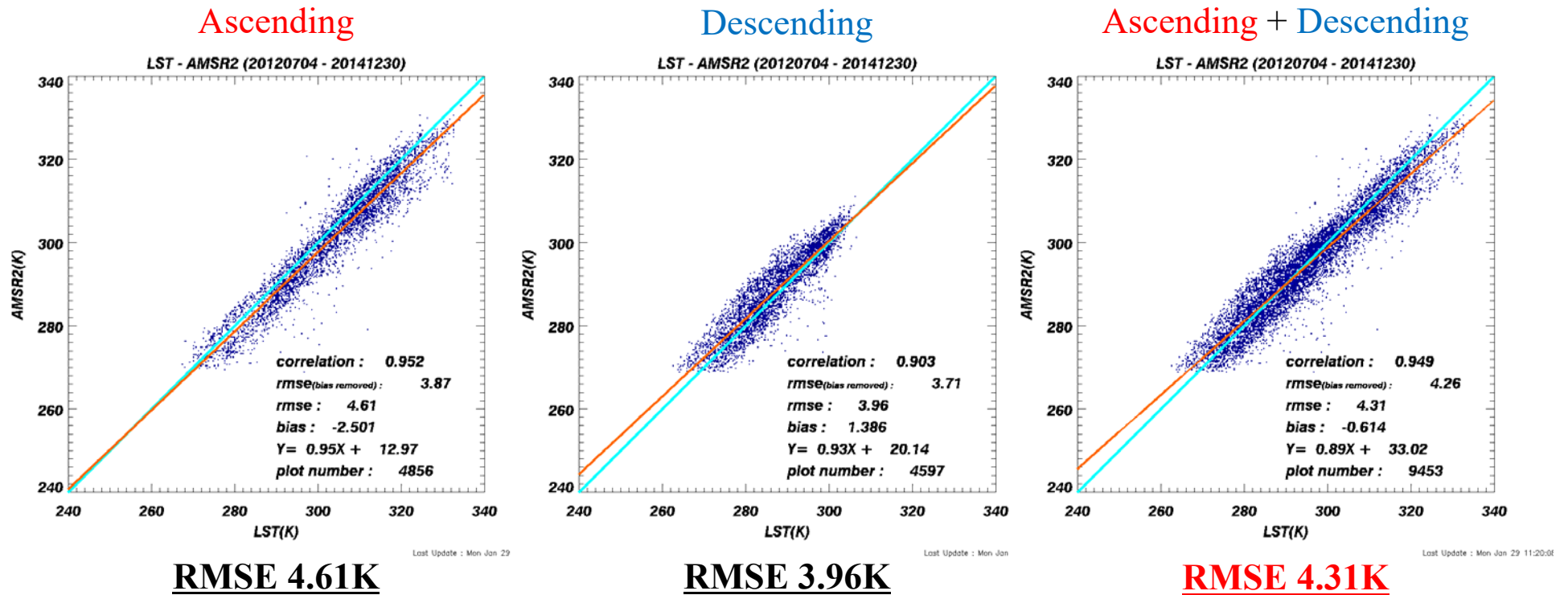


RMSE 3.04K

**RMSE achieved the goal accuracy within 3K.
(.: The significant digit is 1 digit.)**

Validation results

- For low vegetation areas



**RMSE achieved the goal accuracy within 4K.
(∵ The significant digit is 1 digit.)**