

Satellite Retrieval of Microwave Land Surface Emissivity under Clear and Cloudy Skies in China using Observations from AMSR-E and MODIS

Jiheng Hu¹, Yuyun Fu^{1,2}, Peng Zhang³, Qilong Min⁴, Zongting Gao⁵, Shengli Wu³, Rui Li^{1,2,6,7,*}

¹ School of Earth and Space Sciences, University of Science and Technology of China, Hefei, 230026, China

² Institut de recherche sur les forêts, Université du Québec en Abitibi-Témiscamingue (UQAT), Rouyn-Noranda, J9X 5E4, Canada

³ National Satellite Meteorological Center of China Meteorological Administration, Beijing, 100044, China

⁴ Atmospheric Science Research Center, State University of New York, Albany, 12203, USA

⁵ Institute of Meteorological Sciences of Jilin Province, Jilin Provincial Key Laboratory of Changbai Mountain Meteorology & Climate Change, Laboratory of Research for Middle-High Latitude Circulation and East Asian Monsoon, Changchun, 130062, China

⁶ Comparative Planetary Excellence Innovation Center, Chinese Academy of Sciences, Hefei, 230026, China

⁷ State Key Laboratory of Fire Science, University of Science and Technology of China, Hefei, 230026, China

Correspondence to: Rui Li (rli7@ustc.edu.cn)

Table S1. Statistical metrics of comparison of our MLSE with Norouzi_MLSE in China during winter (DJF) in 2003.

Table S2. Statistical metrics of comparison of MLSE between MLSE_Res2 and Moncet_MLSE in China during winter (DJF) in 2003.

Figure S1. The same as Figure 7, but for the comparisons during winter (DJF) in 2003.

Figure S2. same as Figure 8, but for the comparisons during winter (DJF) in 2003.

Figure S3. Distributions of seasonal (summer, 2003) mean surface skin temperatures from (a) ERA-20C reanalysis, (b) ISCCP-DX estimations, (c) MODS/Aqua satellite LST observations, along with the differences between ISCCP, MODIS and ERA SKTs. All samples are collected at the visiting time of Aqua flight.

Figure S4. Comparisons of the brightness temperatures at the top of atmosphere (TB_{TOA}) from AE_L2A version 2 and version 3 on April 26th, 2008.

Supplementary tables and figures

Table S1. Statistical metrics of comparison of our MLSE with Norouzi_MLSE in China during winter (DJF) in 2003.

Frequency (GHz)	Horizontal Polarizations				Vertical Polarizations			
	6.925H	10.65H	18.7H	36.5H	6.925V	10.65V	18.7V	36.5V
Samples	15827	15827	15827	15827	15827	15827	15827	15827
R	0.942	0.933	0.907	0.810	0.799	0.772	0.708	0.671
RMSE	0.019	0.020	0.022	0.032	0.018	0.019	0.020	0.024
MB	-0.008	-0.003	-0.007	0.006	-0.006	-0.001	-0.001	0.013
MAE	0.017	0.015	0.018	0.023	0.015	0.014	0.015	0.021

Table S2. Statistical metrics of comparison of MLSE between MLSE_Res2 and Moncet_MLSE in China during winter (DJF) in 2003.

Frequency (GHz)	Horizontal Polarizations			Vertical Polarizations		
	10.65H	18.7H	36.5H	10.65V	18.7V	36.5V
Samples	15763	15763	15763	15763	15763	15763
R	0.926	0.926	0.928	0.842	0.826	0.841
RMSE	0.022	0.021	0.021	0.018	0.018	0.019
MB	0.019	0.012	0.021	0.018	0.013	0.021
MAE	0.022	0.018	0.023	0.021	0.018	0.023

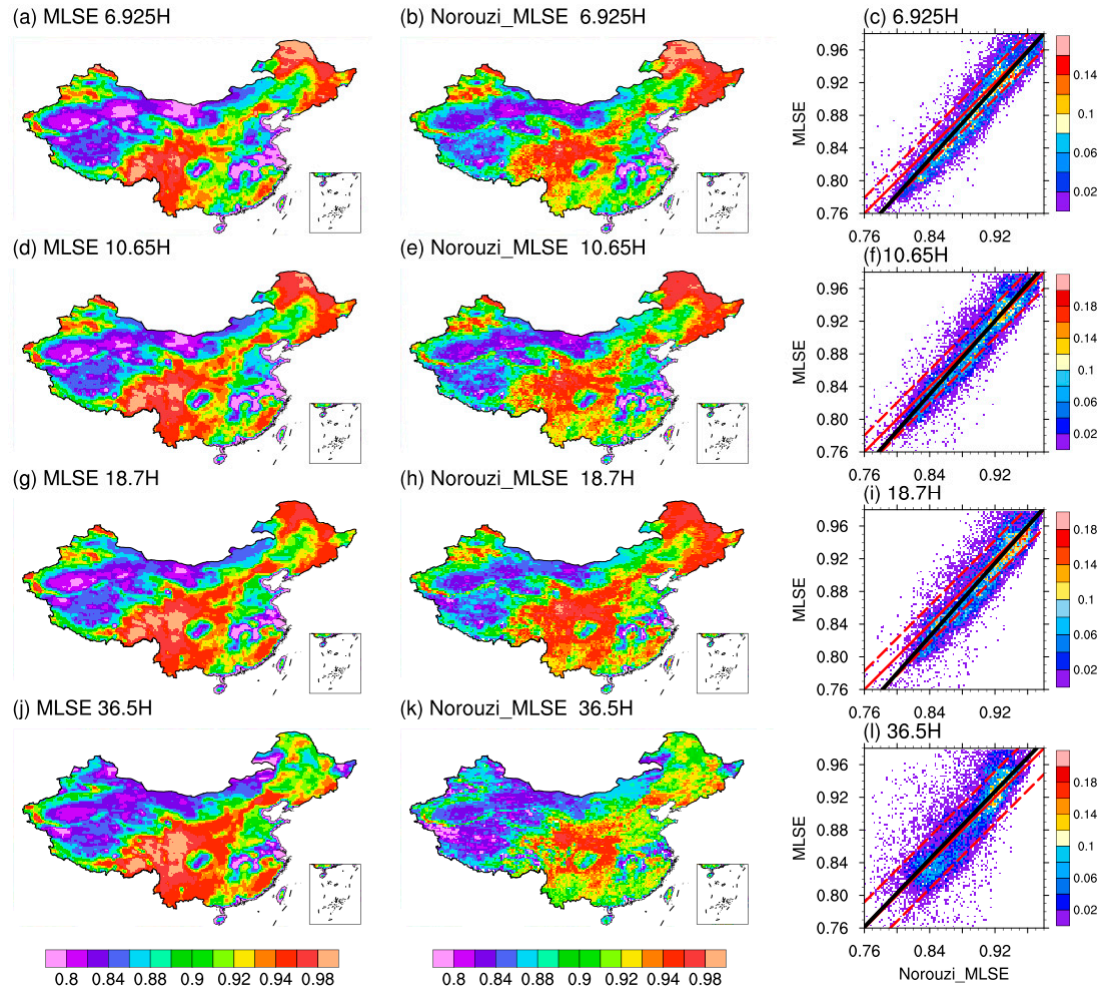


Figure S1. The same as Figure 7, but for the comparisons during winter (DJF) in 2003.

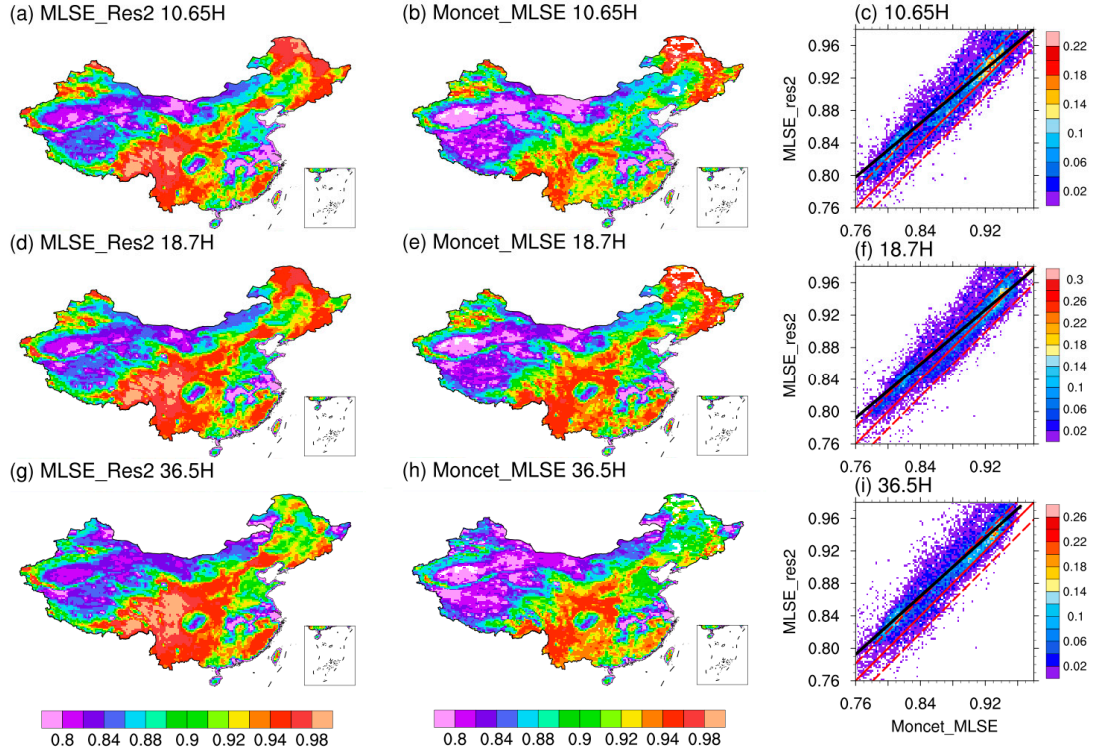


Figure S2. same as Figure 8, but for the comparisons during winter (DJF) in 2003.

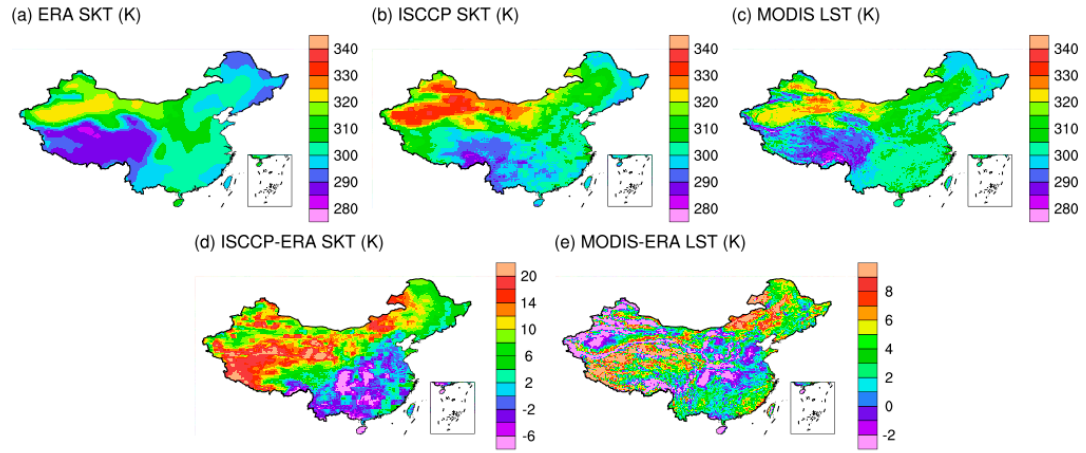


Figure S3. Distributions of seasonal (summer, 2003) mean surface skin temperatures from (a) ERA-20C reanalysis, (b) ISCCP-DX estimations, (c) MODIS/Aqua satellite LST observations, along with the differences between ISCCP, MODIS and ERA SKTs. All samples are collected at the visiting time of Aqua flight.

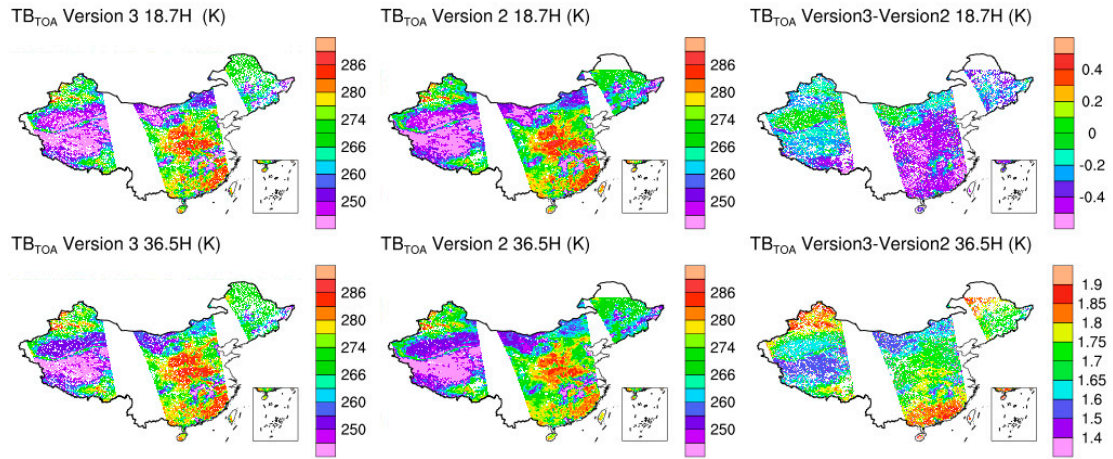


Figure S4. Comparisons of the brightness temperatures at the top of atmosphere (TB_{TOA}) from AE_L2A version 2 and version 3 on April 26th, 2008.