Inter-Sensor Comparison of Land Surface Emissivity Products

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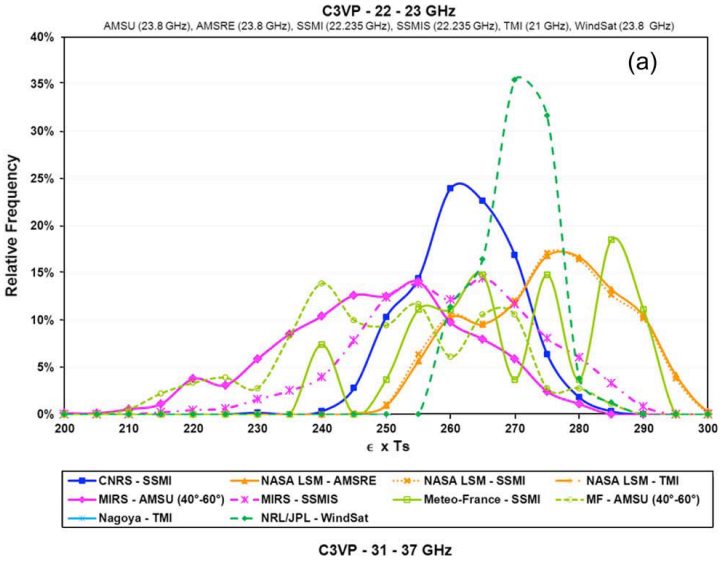
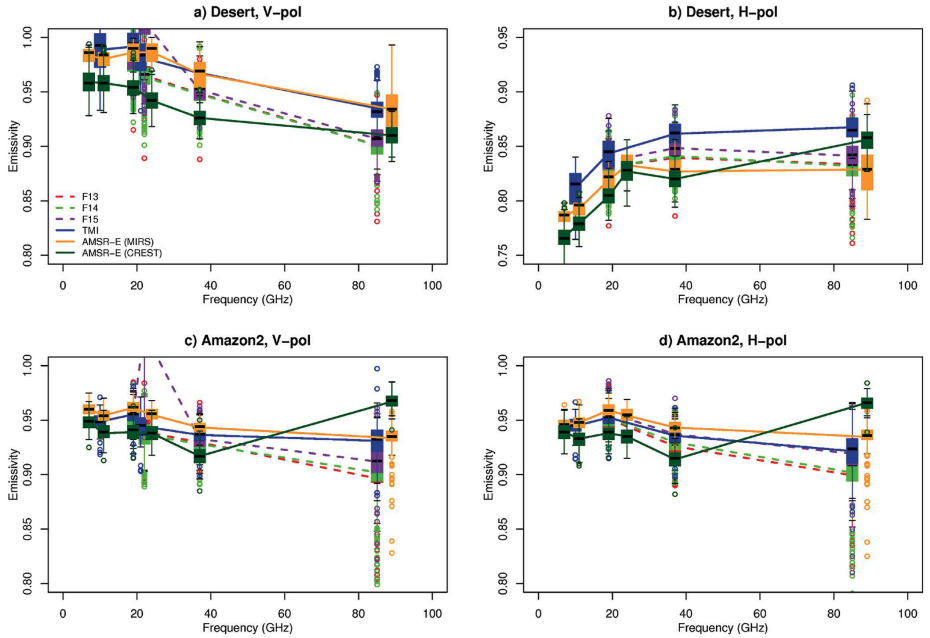
-This study continues previous inter-comparison studies in Global scale.



Ferraro et al, 2012



Tian et al, 2013

Emissivity Products

Sensor	Provider	Frequencies	Incidence Angle	Ancillary Data
AMSR-E	NOAA-CREST	6.9, 10.65, 18.7, 23.8, 36.5, and 89.0	55^0	ISCCP-DX, TOVS
SSM/I	CNRS-France	19.35, 22.235(v), 37.0, and 85.5	53^0	ISCCP-DX, NCEP Re-analysis
TMI	Nagoya Uni.	10.65, 19.35, 21.3(v), 37.0, and 85.5	52.88^0	JRA-25
WindSat	JPL/NRL	6.8, 10.7, 18.7, 23.8, and 37.0	49.9^0 to 55.3^0	NCEP-RA, AIRS

Notes

-It focuses on global scale to investigate inconsistencies and agreements at different land Covers.

-5 years (2003 to 2008) of estimated emissivities from all sensors were used in comparison.

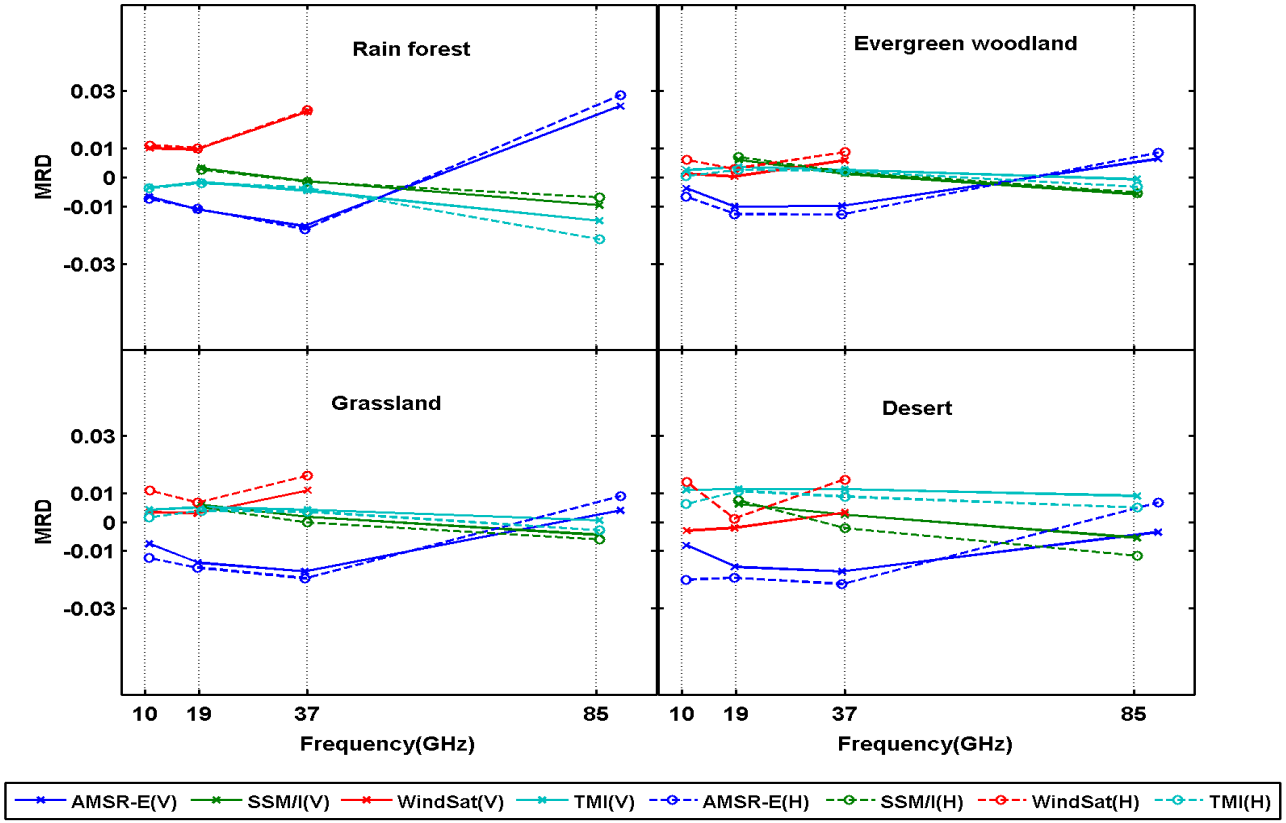
-Just Monthly estimates were used.

- There are differences in INCIDENT ANGLE, FREQUENCY, and TIMING of the sensors that can affect the retrieval. For instance 18.7 and 19.25 GHz.

-Inter-Comparison study is performed on 10, 19, 37, and 85 GHz (namely).

-Products are based on different algorithms and ancillary data sets.

Land Cover-based Analysis Systematic Differences



$$MRD = \sum_{1}^{n} \frac{S_{i,j} - \overline{S}_j}{\overline{S}_j}$$

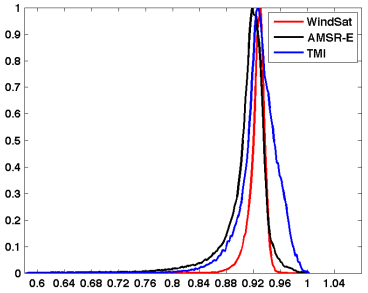
Where $S_{i,j}$ emissivity estimate from product *i* at the month *j*. S_j is the average of all emissivity estimated for the month *j*.

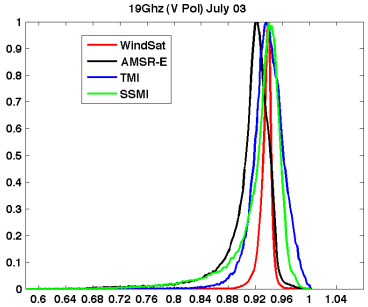
10 GHz

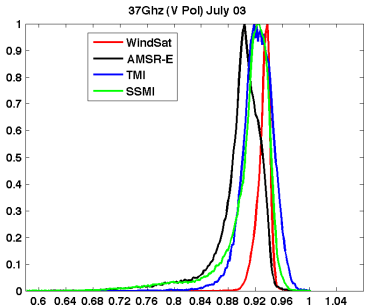
19 GHz

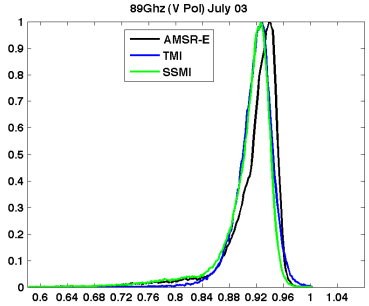
37 GHz

85 GHz



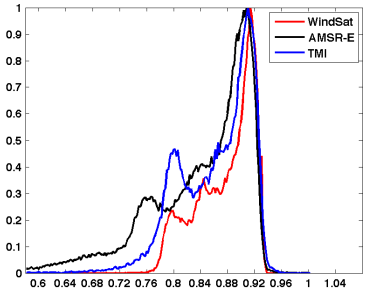


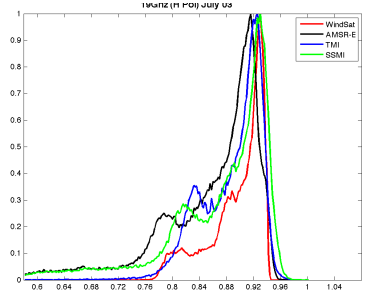


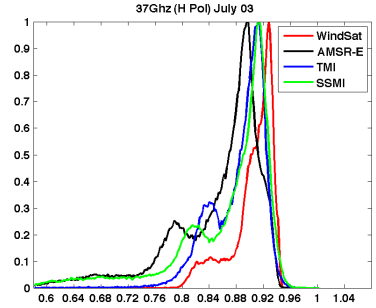


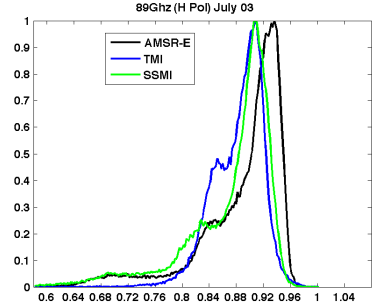
V Pol.

Global Spatial Histograms July 2003



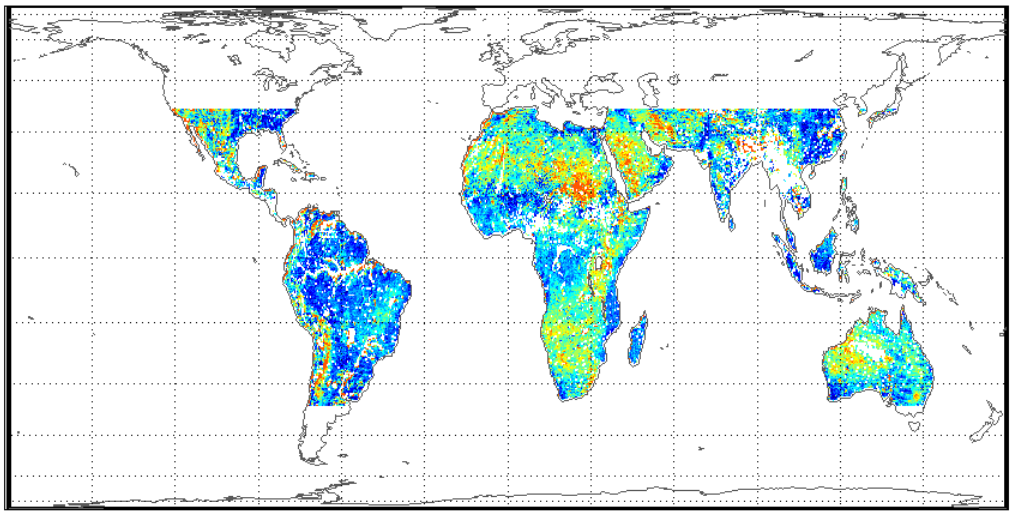




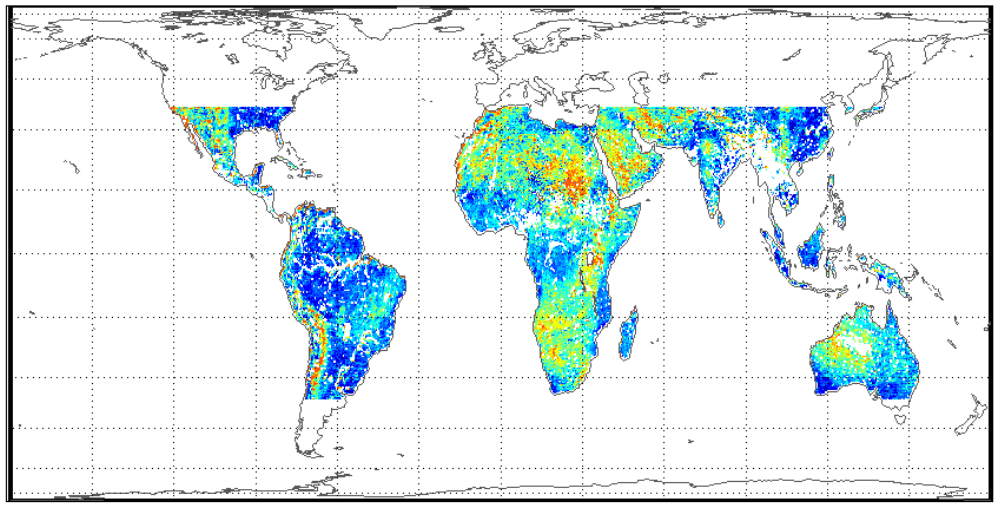


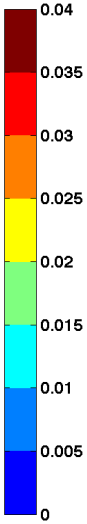
H Pol.

STD Emissivity 19Ghz (H Pol) July 03

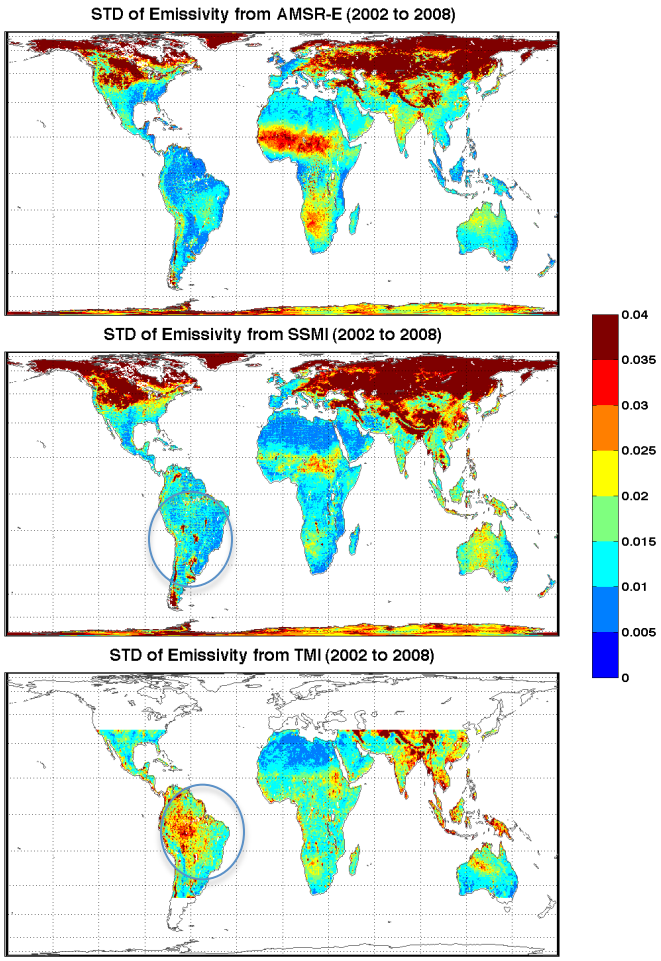


STD of Emissivity 19Ghz (V Pol) July 03

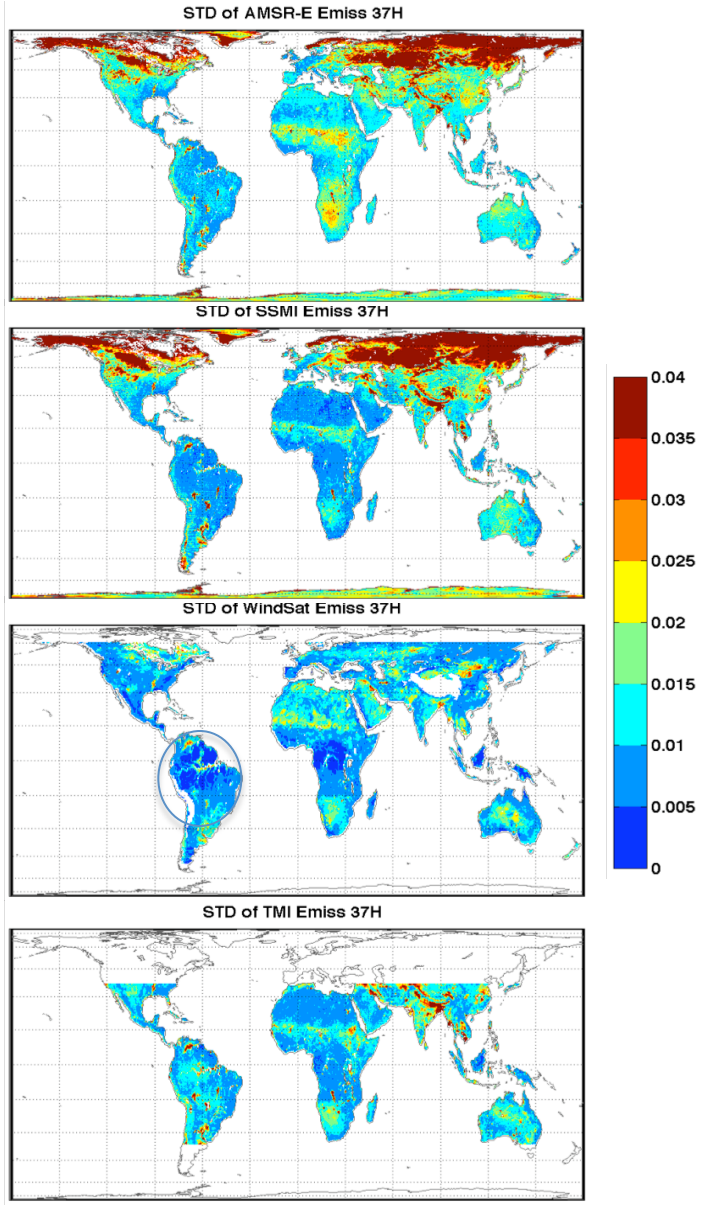




Dynamics of Monthly Emissivity Estimates

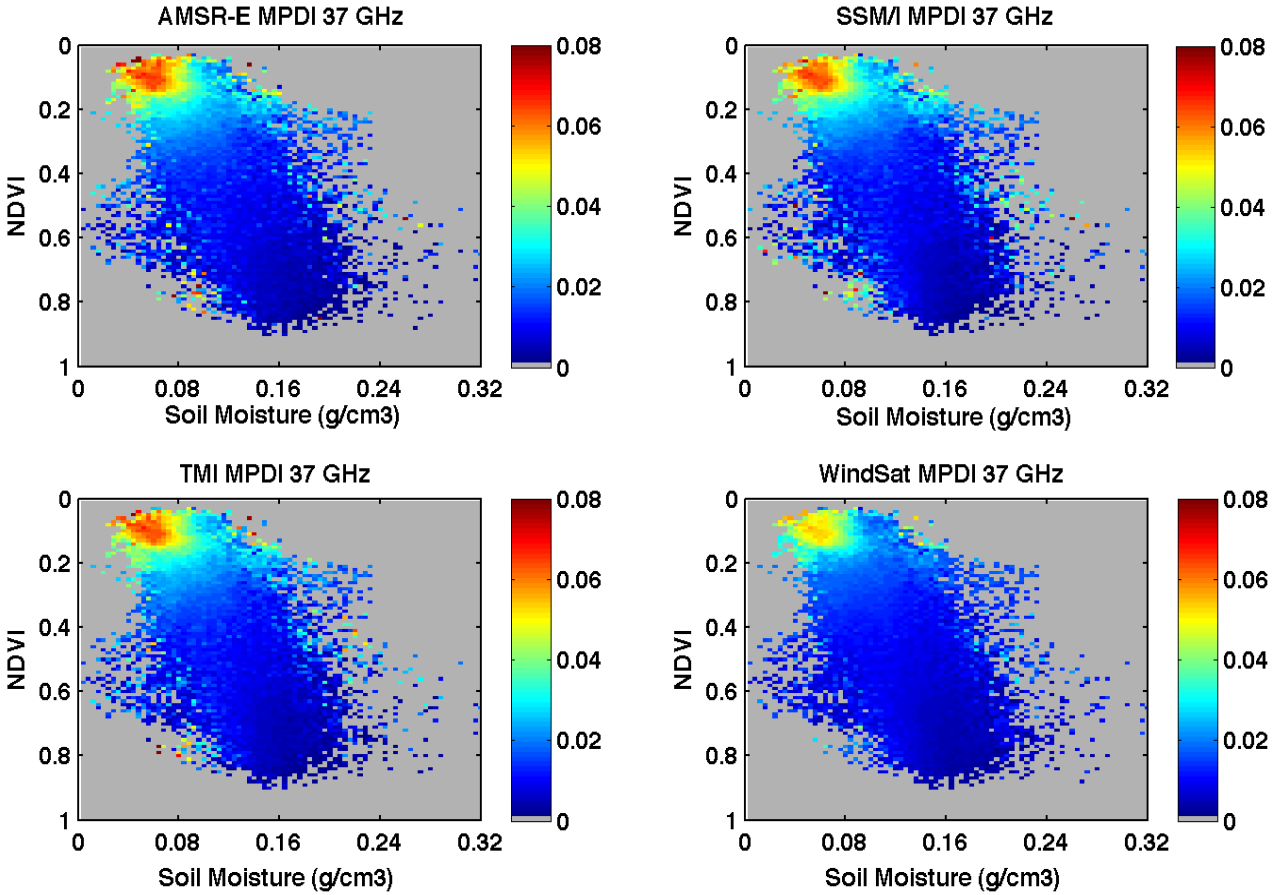


85 GHz



37 GHz

Relationship with Soil Moisture and NDVI



$$MPDI = \frac{\varepsilon_v - \varepsilon_h}{\varepsilon_v + \varepsilon_h}$$

Correlation Map of Monthly Emissivities (H-V) and NDVI