Skin Sea-Surface Temperatures from MODIS & VIIRS

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The clear-sky atmospheric correction algorithms for the retrieval of skin sea-surface temperature from the top-of-atmosphere brightness temperatures from the Terra and Aqua MODIS's and the S-NPP VIIRS are based on the traditional Non-Linear SST formulation. They continue to be refined, primarily through the analysis of the Match-up Data Bases with in situ measurements from drifting buoys, taken from NOAA's iQuam data set and ship radiometers. Matchups are within 30 minutes and10 km. Here we present estimates of error and uncertainties in the satellite-SSTs derived by comparison with skin-SSTs from ship-board radiometer measurements (see Poster 30, Minnett et al).

A source of inaccuracies in the satellite-SSTs is failure of the cloud-screening algorithm; a new approach is expected to improve on the accuracies shown here (see Poster 17, Kilpatrick et al).

MODIS

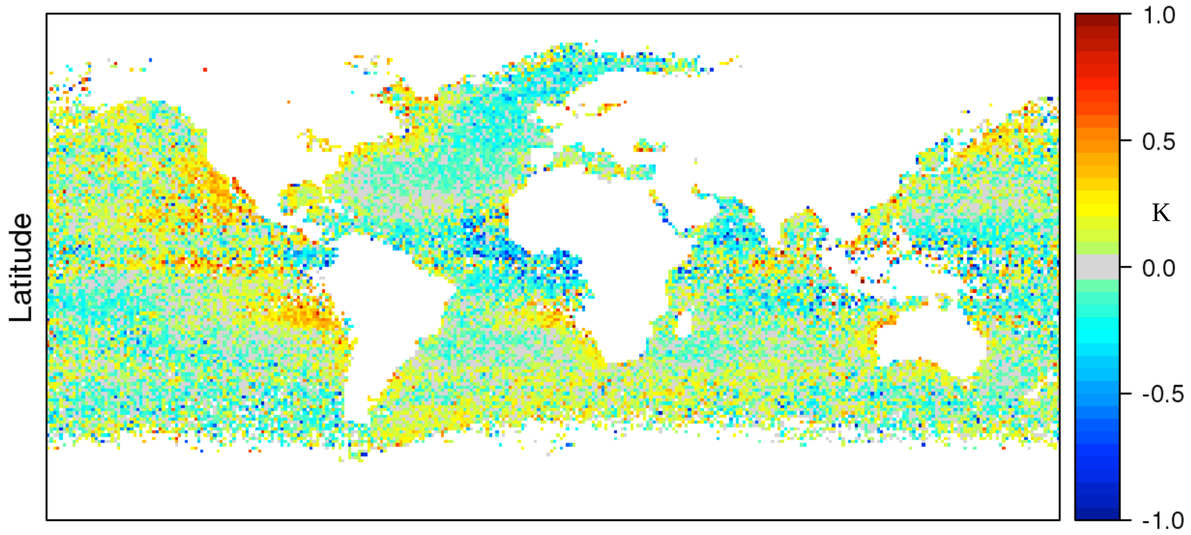
Both Terra and Aqua MODISs continue to perform very well despite both being far beyond the planned lifetimes.

Plot shows bias error distribution between buoys from iQUAM, and SST (11, 12 µm) for the 16-year Terra mission.

Median bias = -0.164 K (attributable to the skin effect)
Robust std. dev. = 0.234 K

Over half a million sub-surface buoy data with best quality matchups.

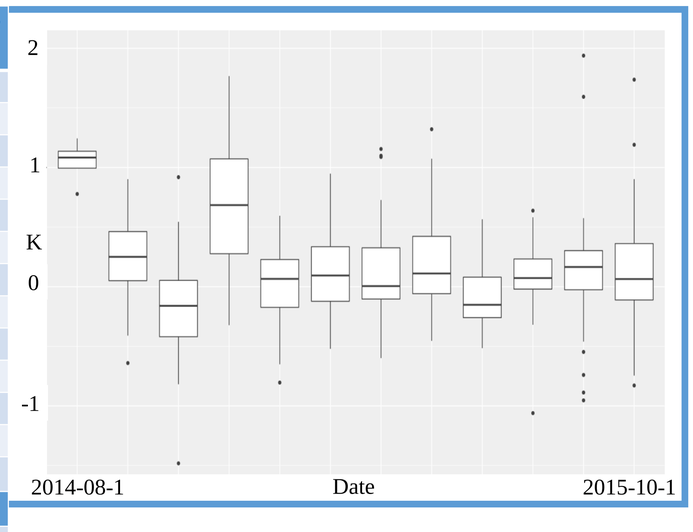
Regional patterns indicate problems with cloud screening and inadequacies in the atmospheric correction algorithm.



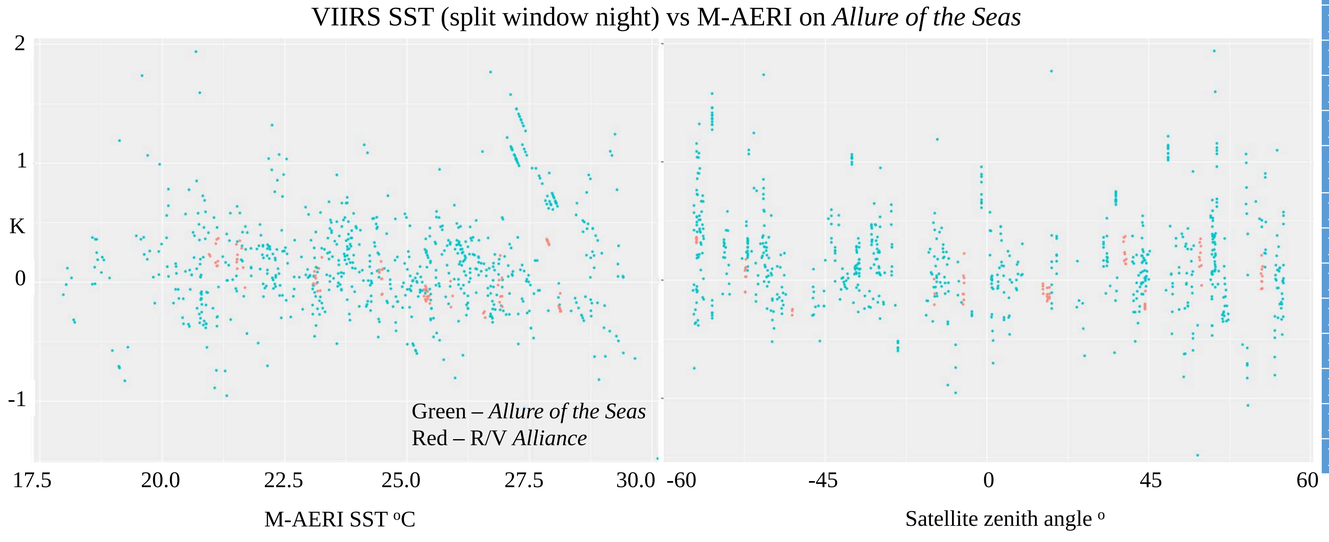
VIIRS

Comparisons are shown with M-AERI measurements on the *Allure of the Seas* and the R/V *Alliance* in the past year, and with ISAR measurements on the *Andromeda Leader* and *Horizon Spirit* in the DoE Magic campaign.

VIIRS SST (split window night) vs M-AERI on *Allure of the Seas*					
Month	Mean	Median	sd	rsd	N
Sep 2014	0.251	0.251	0.371	0.268	24
Oct 2014	-0.172	-0.16	0.454	0.327	31
Nov 2014	0.693	0.685	0.506	0.365	94
Jan 2015	0.035	0.066	0.289	0.209	85
Feb 2015	0.116	0.094	0.306	0.221	58
Mar 2015	0.076	0.005	0.382	0.276	60
Jun 2015	0.23	0.111	0.43	0.31	65
Jul 2015	-0.059	-0.152	0.327	0.236	11
Aug 2015	0.091	0.073	0.264	0.19	51
Sep 2015	0.154	0.166	0.429	0.31	106
Oct 2015	0.11	0.065	0.394	0.285	133
All	0.186	0.127	0.451	0.326	722
VIIRS SST vs M-AERI on R/V *Alliance*					
Nov-Dec, 2015	0.030	0.009	0.196	0.142	81



VIIRS SST (split window night) vs M-AERI on *Allure of the Seas*



VIIRS SST	Split window night					Triple window night				
ISAR Cruise	Mean	Median	sd	rsd	N	Mean	Median	sd	rsd	N
IS_al20	-1.17	-1.029	1.19	0.859	17	0.175	0.155	0.103	0.074	5
IS_al21	-0.189	-0.110	0.427	0.308	34	-0.26	-0.306	0.573	0.414	33
IS_al22	5.011	7.180	4.590	3.311	21	5.179	7.089	4.673	3.372	20
IS_al23	-1.212	-1.745	0.815	0.588	11	-0.562	-0.325	0.505	0.364	8
IS_al24	1.142	1.183	0.895	0.646	22	1.315	1.53	0.871	0.628	22
IS_al25	-0.074	-0.042	0.738	0.533	24	0.099	-0.076	0.453	0.327	18
IS_al26	-0.273	-0.281	0.315	0.227	12	0.077	0.072	0.245	0.177	27
IS_al27	0.001	0.086	0.668	0.482	31	-0.045	0.002	0.324	0.234	109
IS_al29	0.066	0.006	0.377	0.272	140	-0.25	-0.188	0.45	0.324	52
IS_al30	-0.154	-0.200	0.465	0.336	71	-0.584	-0.477	0.716	0.516	44
IS_al31	-0.538	-0.401	0.787	0.568	50	-0.054	0.005	0.425	0.307	89
IS_al32	-0.120	-0.018	0.389	0.281	90	0.173	0.177	0.418	0.302	26
IS_al33	0.256	0.286	0.439	0.317	26	0.104	-0.066	0.558	0.403	164
IS_al37	0.020	-0.036	0.658	0.475	200	-0.23	-0.206	0.754	0.544	71
IS_al38	-0.524	-0.444	0.877	0.633	79	0.175	0.198	0.468	0.338	71
IS_al39	0.057	0.115	0.499	0.36	143	-0.218	-0.172	0.238	0.171	83
IS_al40	-0.255	-0.198	0.255	0.184	97	0.531	0.654	0.38	0.274	153
IS_al41	0.560	0.638	0.455	0.328	192	0.468	0.491	0.344	0.248	226
IS_al42	0.493	0.440	0.431	0.311	247	0.171	0.219	0.254	0.183	25
IS_magic03	0.142	0.357	0.505	0.364	27	-0.025	-0.084	0.128	0.092	11
IS_magic04	0.067	0.114	0.221	0.159	16	-0.065	-0.089	0.233	0.168	15
IS_magic05	0.278	0.189	0.657	0.474	23	0.027	0.15	0.323	0.233	9
IS_magic07	0.655	0.251	1.490	1.075	27	0.079	0.051	0.244	0.176	13
IS_magic08	-0.026	-0.041	0.204	0.147	14	0.122	0.195	0.216	0.156	11
IS_magic09	0.066	0.095	0.117	0.084	11	0.746	0.69	0.221	0.159	14
IS_magic12	0.537	0.547	0.298	0.215	18	-0.078	-0.037	0.072	0.052	3
IS_magic13	-0.153	-0.183	0.242	0.174	6	0.162	0.162	0.008	0.006	2
IS_magic14	-0.152	-0.217	0.119	0.086	3	-0.335	-0.384	0.131	0.095	8
IS_magic15	-0.413	-0.640	0.623	0.45	11	0.326	0.248	0.189	0.137	7
IS_magic16	0.221	0.241	0.139	0.1	9	0.09	0.051	0.326	0.235	29
IS_magic17	0.020	-0.018	0.298	0.215	48	0.044	0.073	0.27	0.195	35
IS_magic18	-0.005	-0.039	0.479	0.345	55	-0.021	-0.034	0.116	0.084	18
IS_magic19	-0.301	-0.323	0.179	0.129	18	0.175	0.155	0.103	0.074	5

GHRSST Group for High Resolution Sea Surface Temperature
17th International Science Team Meeting (GHRSST XVII)
6th-10th June 2016

Acknowledgements: Funding from NASA Physical Oceanography Program and NOAA NESDIS STAR.
MODIS and VIIRS data are processed by the OBPG at NASA Goddard, and the NASA PO.DAAC. Data are distributed and achieved by the OBPG, the PO.DAAC and NOAA NCEI.