Atmos. Meas. Tech. Discuss., 8, C1590–C1592, 2015
www.atmos-meas-tech-discuss.net/8/C1590/2015/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Uncertainties of satellite-derived surface skin temperatures in the polar oceans: MODIS, AIRS/AMSU, and AIRS only" *by* H.-J. Kang et al.

C.-Y. Liu (Referee)

cyliu@csrsr.ncu.edu.tw

Received and published: 17 June 2015

This paper presents a detailed methodology and comparisons for the analysis of MODIS (MODIS), synthetic AMSU/AIRS (AA) and so-called AIRS only (AO) level-3 products over given period in both northern and southern hemispheres close to the poles. The authors tried to use the years between 2003-2014 as climatology reference, and separate two 9-day windows to represent the "winter" IST/SST. In general, the manuscript is well organized in many aspects (but blurred in some descriptions), and is suitable for the interests and scopes for Atmos. Meas. Tech. (AMT). Therefore, I would like to suggest the authors to address and clarify certain concepts before the

fully acceptances by the Editor Board.

First, the terminology of “AIRS only” may not be a good choice throughout the manuscript. We understand that this term is adopted from AIRS Science Team. However, this “AIRS only” may lead the misunderstanding of this hyperspectral IR sensor. AIRS is an advanced IR sounder with approximately 13.5 km IFOV spatial resolution on the ground at nadir, while AMSU is 45 km spatial resolution. The “AIRS only” in this manuscript eventually stands for the combined use of 3-by-3 AIRS single field-of-view (SFOV) radiances. Therefore, the retrieved variables, for example, atmospheric thermodynamic, cloud, and surface parameters (e.g., SST/IST) is the Level 2 (AIRS2RET) product based on AIRS 3-by-3 SFOVs ($\sim$45 km spatial resolution) data. There are further post-processing and quality control to obtain Level 3 daily gridded product (AIRS3STD). The author should be aware of, cite the discussion in, and elaborate the results, some previous studies that use the real “AIRS only” observation (i.e., the AIRS SFOV data), although to a different end from what is address in this manuscript [e.g., (i) Liu et al. (2014), IEEE-TGRS, 52(11), pp. 6957-6963, doi:10.1109/TGRS.2014.2305992 ; (ii) Zheng et al. (2015), Adv. Atmos. Sci., 32(3), pp. 319–335, doi: 10.1007/s00376-014-3162-z ; (iii) Li et al. (2012), Weather Forecasting, 27(2), pp. 515-524, doi: 10.1175/WAF-D-10-05057.1].

Second, the manuscript starts with the processing of NASA/Auqa MODIS Tskin. From Fig. 1(a) and 1(b), the dataset doesn’t cover lower latitudes but only the latitudes close to the South Pole. Although author mentioned the process from its original 4km by 4km to 1 degree by 1 degree, the comparisons among the other two data sets is not in an equal level. The ice coverage won’t be that symmetrically close to the South Pole. Since the studied temporal window is only 9-day per year per hemisphere (data amount should be manageable), the use of daily Level 2 is strongly recommended but not Level 3.

Lastly, when I look over the manuscript, it discussed surface skin temperatures which has two categories :IST and SST. The authors should make sub-title (IST vs SST),

AMTD
8, C1590–C1592, 2015

such as Section 3 and 4, in the content. This will help reader to follow the analysis and discussion logics.

The paper is, for the most part, scientifically strong and should be published in AMT subject to some revisions, mostly in terms of contextualizing the findings so that they can ultimately make a significant advance for the field.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 4451, 2015.