New OSI SAF Metop-B/AVHRR SST operational products

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Introduction

The EUMETSAT OSI SAF (Ocean and Sea Ice Satellite Application Facility) is developing, processing and delivering SST (Sea Surface Temperature) products operationally in near real-time for Metop satellites. Despite good global statistics over the past 6 years (bias below $0.1^\circ\,\mathrm{C}$ and standard deviation below $0.6^\circ\,\mathrm{C}$), regional and seasonal biases have been evidenced in global Metop SST products. Methodologies have been developed to correct for these biases. They rely on simulations of brightness temperature by a radiative transfer model using numerical weather prediction model output of humidity profile. The OSI SAF has recently been developing a new processing chain for producing operational SST product from Metop-B/AVHRR. This chain ingests granules of three minutes of orbit at full spatial resolution (approximately 1km) and produces SST L2P and L3 products in the GDSv2 format. In order to implement a bias correction scheme, simulations of brightness temperature at 3.7, 11.8 and 12 μm have to be computed on a pixel basis at full resolution for each granule. Products of this new processing chain became the operational OSI SAF Metop/AVHRR SST products on the 23rd of February 2016. Here we present the methods used in the chain and validation results of the new OSI SAF Metop-B/AVHRR SST products against drifter measurements.

Overview of the processing chain

Characteristics of processing chain:

■ All clear-sky sea and lake pixels are processed

Uses day and night specific regression based algorithms

Include the bias correction scheme (Le Borgne et al., 2011)

Input:

METOP-B/AVHRR granules (3 minutes of orbit) Brightness temperature at 3.7, 10.8 and $12\mu m$ MAIA cloud mask

ECMWF atmospheric profiles (T,q) ■ OSTIA SST analysis

Output: Three OSI SAF products, all GHRSST Data Specification v2 compliant.

■ OSI-201b: L3C Global, 0.05°/12h

■ OSI-202b: L3C North Atlantic Region, 2km/6h

■ OSI-204b: L2P granule in satellite projection, 1km/3min



The Match up Data Set (MDS) In situ measurements from moored buoys and drifting buoys are gathered operationally through the Global Telecommunication System (GTS). They are collocated to full resolution satellite information.

■ 5 days delay from satellite estimate

Time frame around measurement: 3 hours

Nighttime and daytime algorithm are validated separately

Validation

Error dependencies (August 2015):

Temporal evaluation (April to October 2015):









Global statistics (April to October 2015):							
Day					Night		
Quality level	Ν	bias	Std		Ν	bias	Std
3-5	57863	-0.19	0.56		47634	-0.21	0.53
5	11154	0.05	0.42		12051	-0.01	0.34
4	13817	-0.11	0.52		14236	-0.11	0.47
3	32892	-0.27	0.60		21347	-0.40	0.60



Conclusion

The chain is delivering operational products since 23rd of February 2016. 2 Data are available through: Ifremer FTP server http://www.osi-saf.org; EUMETCast (Satellite) broadcast system); NAIAD: http://naiad.ifremer.fr/

Future developments:

Test the usage of new cloud masque processor MAIA v4.

Test benefit of new smoothed Saharan Dust Index.

Le Borgne, P., Roquet, H. and Merchant, C. Estimation of Sea Surface Temperature from the Spinning Enhanced Visible and Infrared Imager, improved using numerical weather prediction. Remote Sensing of Environment, 2011, 115, 55-65.

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