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Geoscientific Model Development Discussions

Interactive comment on "High Performance Software Framework for the Calculation of Satellite-to-Satellite Data Matchups (MMS version 1.2)" *by* Thomas Block et al.

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Dear referee,

first, we like to thank you for the positive and exhaustive review of the manuscript submitted.

Please find below answers and comments on your remarks:

Context of matchup-processing:

Agreed that it is useful to clarify this. We are well familiar with the Felyx project, which started during the first phase of the SST-CCI project, when the initial implementation

of the MMS predecessor system was already running operationally. We analysed the requirements of Felyx and concluded that for sensor harmonisation the screening functionality and the data-throughput do not match our project needs. We will follow your suggestion and mention Felyx in the introduction.

Type of data:

Agreed .The MMS version described in the publication has been designed to operate on L1/L2 data of polar orbiting satellites. These can be either granules or full orbit files; the requirement is that the data follows a time trajectory (i.e. is acquired at consecutive time intervals along an orbit geometry). Naturally, this is not fulfilled when using aggregated data as L3 or L4 since the timing information is collapsed to an interval. Since submitting the paper a year ago, we have extended the system to also operate on geostationary and in-situ data. We will follow your suggestion and clarify this in the introduction.

Section 4.1:

Agreed: Re-reading the introduction to this section after a long time the description is not clear enough. The following section has been added to Chapter 4:

"For each satellite data product accessible to the MMS system a corresponding metadata record is stored in the database. The metadata record contains information about the data file location, the sensor, the acquisition time, the bounding geometry of the acquisition, the orbit nadir trajectory, an ascending/descending node flag and the ground-segment data processor version. This data record has been designed to optimise database storage volume (and hence access performance) while keeping sufficient information to operate the matchup system."

Also, we have re-phrased the first sentence to:

"The satellite metadata stored in the database has been constructed in a way that allows detecting overlapping regions possibly containing matchups without the need to

open the associated satellite data products."

I hope this clarifies your question.

Section 5:

The MMS detects and extracts any matching pair of pixels within the time and space constraints. This – as you stated – can result in multiple associations of a single pixel. We have implemented mechanisms to optionally reduce these associations to one-to-one matches – either using the closest pair in space or time – whichever is required by the scientific context. We have not elaborated this in the text because our focus is on the novel quick and parallelized detection algorithm.

Agreed: We will add a short note to the text that elaborates this possibility.

Section 8 and 9:

Agreed. Yes, you are absolutely right. The current MMS system ($\sim$ one year after writing the paper) can handle SST in-situ data of various sources for validation. We have scheduled extension to support Aeronet and GRUAN data in 2018 – making the MMS even more flexible. We felt that this is beyond the scope of the current paper. If interested, please have a look at other project publications with a focus on validation, e.g.: https://www.researchgate.net/publication/322905535_Optimal_Estimation_of_Sea_Surface_E

All other remarks and suggestion stated in your review will be considered in the text and corresponding sections re-phrased to be more precise.

Thank you for your effort and valuable contribution,

Tom Block

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