

Interactive comment on “Ocean colour products from geostationary platforms, opportunities with Meteosat Second and Third Generation” by E. J. Kwiatkowska et al.

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The referee is gratefully acknowledged for providing valuable comments about the manuscript leading to improvement of the paper. Below the authors refer to the individual comments and specify changes that were made to the text.

“Although the title says ‘Ocean colour products from geostationary platforms’ and the introduction claims ‘This paper describes the ongoing effort to develop operational ocean colour products’ not a single novel ocean color product is presented, only a small scale figure adopted from another publication. “

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To provide a preliminary insight into the ongoing SEVIRI product development, an image of East Anglian plume is included as Figure 1. The statement about novel ocean colour products is however unclear. The paper emphasizes that SEVIRI is not an ocean colour instrument so it cannot be expected to support novel products. The paper points at limitations of SEVIRI for ocean colour. However it also documents that SEVIRI's multi-temporal capabilities can benefit some users requiring improved local-area coverage or frequent diurnal observations for a subset of standard ocean colour products. Perhaps the understanding of ‘products’ as providing hourly diurnal coverage and a long-term time series of these diurnal observations is what the referee suggests as a novel contribution.

“In my opinion a fare title would be ‘Review of the user requirements and actual possibilities of ocean color products from Meteosat Second and Third Generation satellites”

Change to the paper title is proposed as: ‘Ocean colour opportunities from Meteosat Second and Third Generation geostationary platforms’.

“The user requirements are listed at a very high level and don't match the list of limitations given at a low technical / scientific level. Which requirements can actually be met if any? It is possible to give answer to this question based on the available knowledge and such an answer is the main thing worth publishing. However it remains unclear. A proper qualitative analysis of limitations with respect to all requirements is absolutely needed and can be summarized as an additional column in table 3: ‘Feasibility’. For example, fig. 3. indicate that lowest error in water leaving reflectance in the North Sea in the best conditions cannot be below 50%. Does it automatically indicate that almost all products from table 3 become non feasible since they require accuracy in the order of 5% (OCCCG reports) ¿’

We understand the drive for specific feasibility and uncertainty definitions. However, we did not obtain from users qualitative requirements on the uncertainties for the subset of products obtainable from SEVIRI. Community requirements for these products are

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also not available. The 5% water reflectance uncertainty in IOCCG documents relates to case 1 waters (clear, non-turbid waters) and typically to blue-green wavelengths and it reflects the follow-on requirements for chlorophyll-a concentration retrievals. Our approach therefore has been to develop the best algorithms and products we can, bearing SEVIRI limitations, and estimate product uncertainties through the process of comprehensive validations (although we are further limited by a small number of in situ turbidity measurements coinciding with water-reflectance measurements in the red-NIR). To improve on SEVIRI's signal-to-noise ratio, we are accumulating products sensed every 15 min to the hourly coverage. The validations will provide the uncertainties for users to decide on the use of the data in their specific applications. In our view it is better to make these products available as evaluation products and to galvanize community interest in potential future geostationary ocean colour missions than not to produce them at all. Explanations as to this point are now included in the text, particularly in section 2 and section 3.1.

"It is very hard to judge which group of users is represented in the given requirements. Details of surveys are not given. Number of interviewees, their scientific and technical level, background and field of work is not specified. "

Section 2 introduction was appropriately updated to address this point.

"In this context the list of the required products seems to be rather arbitrary. It is recommended to extend this list to include all common products currently derivable from polar orbiting satellites and, as suggested above, tentatively indicate 'realistic accuracy' or 'feasibility' for each of them to clearly illustrate potential of ocean color from geostationary satellites. "

Many ocean colour products are at all feasible from SEVIRI. It is not useful to list all products currently derivable from polar orbiting satellites because only a small sub-group of these products is possible from SEVIRI. Dedicated ocean colour sensors in polar orbits incorporate narrow-band wavelengths in the blue, green, red, NIR which

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are not available on SEVIRI. Table 4 is now modified to include additional products that are not feasible from SEVIRI but may be feasible from the FCI instrument.

"I find these two phrases "EUMETSAT's Meteosat Third Generation (MTG) Imaging satellites, with the first of the series planned for launch in 2020" and "The main goal of the MSFD is to achieve Good Environmental Status of EU marine waters by 2020." compromising the entire idea of the manuscript. "

We are not fully clear what is meant but try to respond: achievement of the Good Environmental Status is not marked by a single date and assumed to be compliant indefinitely. Monitoring whether GES requirements are met will have to be continuous into the future. SEVIRI/FCI data can provide systematic and synoptic measurements supporting continuous evidence and detection of nonconformance.

"Why to mention FCI at all if its resolution is too low for WFD and it is launched after MSFD?"

At the end of section 2.1, the explanation is given that, for WFD, the spatial resolution of SEVIRI could only support monitoring of the few biggest lakes in Europe while FCI will have an increased spatial resolution with which it can support monitoring of additional lakes.

"There should also be other serious reasons (climate change is definitely being one of them) to employ FCI which are worth elaborating."

Potential of FCI to provide the chlorophyll-a concentration product is emphasized in the text, which will then open further applications related to water resource monitoring and ecosystem modelling, as explained in section 2.3. Climate change is a possible application however before we have FCI data we are not ready to support such a bold statement because FCI specifications are currently insufficient to fulfil product uncertainty requirements dictated by GCOS.