Ocean Sci. Discuss., 9, C1472–C1475, 2013
www.ocean-sci-discuss.net/9/C1472/2013/

Ocean Science Discussions

Interactive comment on "MERIS-based ocean colour classification with the discrete Forel–Ule scale" *by* M. R. Wernand et al.

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Authors reply on Samantha Lavender's comment (Referee): Comment: The paper describes the Forel–Ule MERIS (FUME) algorithm and its application to MERIS imagery followed by a comparison of MERIS to in-situ derived FU numbers, as a means of validation, and then an analysis of MERIS FU numbers alongside historical data. To link this paper to the wider community's activities I think it would be helpful to mention the often undertaken classification of waters as Case 1 or Case 2 and the research of Moore et al (2009). For me, I see the FU scale as a natural companion of this research as it allows for the grouping of waters/pixels with similar optical characteristics.

Reply: At the end of the introduction we added (also the Morel, Moore and Hommersom references were added: Distinct optical water types can now be classified accord-

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ing to Forel-Ule's scale and makes it possible to enhance satellite derived products, such as chlorophyll (Moore et al., 2009). Ocean color remote sensing techniques have traditionally been based on two optical water types, known as "Case 1"and "Case 2" (Morel & Prieur, 1977). However, this classification is mainly based on the intrinsic composition, i.e. the role of algae (and related degradation products) in the generation of water colour. Moore et al. (2009) proposed to extent the optical water classification to eight clusters, based on an unsupervised classification of the NOMAD data base of remote sensing reflectance spectra. The reflection spectrum of each satellite pixel has a certain probability to belong to each of the 8 clusters. Another classification method that can be tuned to local properties is proposed by Hommersom et al. (2011). In this work we go back to use the oldest classification of 21 pre-defined scales and use the relative colour difference (colour comparator scale) instead of absolute remote sensing reflectance to classify each pixel to only one representative FU-number.

Specific Comments: Comment: Abstract: there is no summary of the MERIS versus in-situ validation result (i.e. whether it was positive or negative) plus the historical comparisons are not mentioned.

Reply: At the end of the abstract we added: Similar patterns and FU numbers were observed comparing MERIS ocean colour distribution maps with ground truth Forel–Ule observations. The FU numbers modelled from in situ radiometer measurements showed a good correlation with observed FU numbers (R2 = 0.81 when full spectra are used and R2 = 0.71 when MERIS bands are used).

Comment: Page 2824 Line 11 – I find the sentence "Next to the North: : :" strangely worded and Reply: Rehrazed into: North Sea and Wadden Sea (Hommersom et al., 2009) were optically sampled in 2006 (Fig. 5) and several lakes and rivers were sampled in 2001, 2006 and 2007.

Comment: Figure 5 doesn't help as it doesn't show the location of the sampling points.

Reply: Answer to reviewer: the sample locations of North Sea and Wadden Sea from

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which FU numbers were derived from match up radiometric and MERIS data are based in the red circles.

Comment: Page 2828 Line 4– than instead of then?

Reply: changed

Comment: For Figure 5 it would be helpful to view the FU map alongside a Level 2 pseudo-true colour composite as an indication of the information held within the spectral data. This would also aid my understanding of the transect results.

reply: Added a true colour image

Please also note the supplement to this comment:
http://www.ocean-sci-discuss.net/9/C1472/2013/osd-9-C1472-2013-supplement.pdf

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Interactive comment on Ocean Sci. Discuss., 9, 2817, 2012.

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Interactive Comment

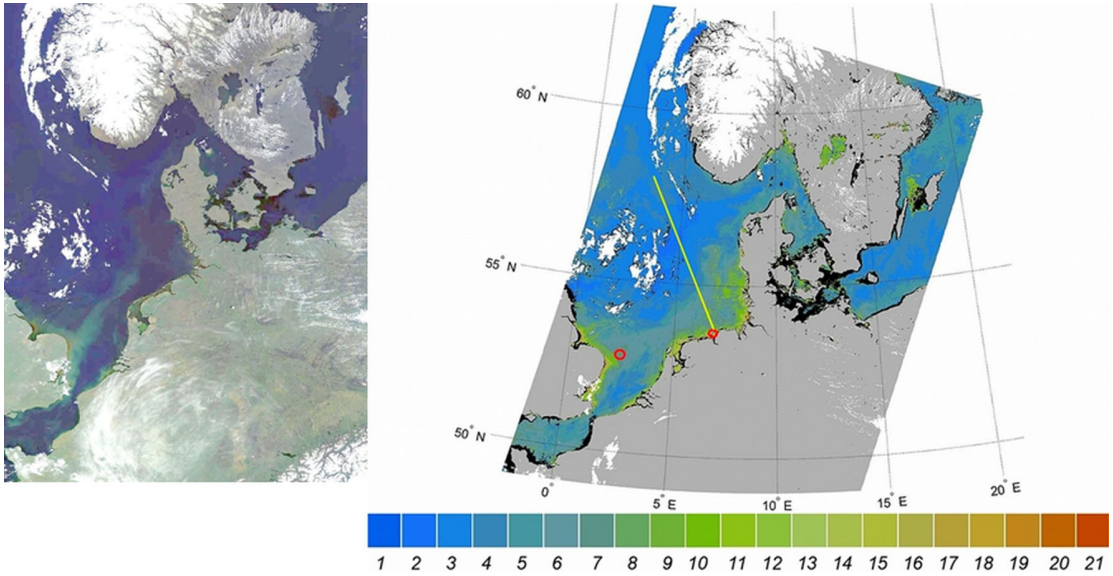

Fig. 1. Fig. 5. Left. MERIS true colour image (4 May 2006). Right: The spring FU map of the turbid North Sea of shows FU values rangingfrom 3 to 9 (red circle near England FU6). The Wadden Sea area within bar

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