

Comparison of Modeled and Satellite chlorophyll *a* with Observations

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1. Comparison of seasonal variation of Chlorophyll *a*

The observations are selected from 18 stations in the Baltic Sea (Figure 1), representing for offshore regions, coastal areas and estuaries. The seasonal dynamics are showed in Figure 2, where the black circles stand for observations, the red curves for modeled results and the green curves for the satellite results. The percentage biases relative observations are 17.3% and 12.2% for the modeled results and the satellite results respectively. The correlation with observations is 0.42 and 0.31 for the modeled results and the satellite results respectively. As the satellite products are known poor in winter, the statistical results excluding months Novenmebr-Feburay are 11.7% and 6.1% of percentage biases for the modeled results and the satellite results respectively, and their correlations are 0.21 and 0.31.

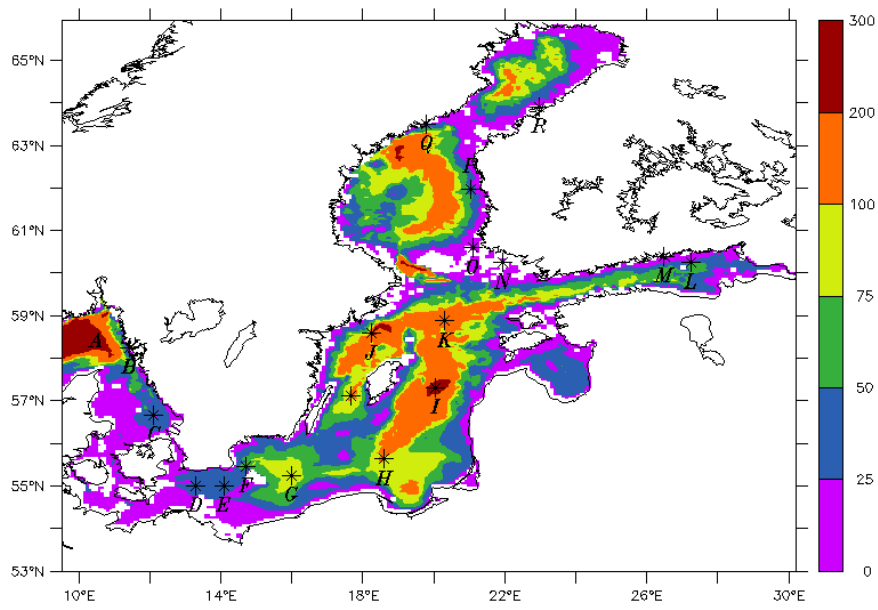


Figure 1. Bathymetry of the Baltic Sea (unit: m) and observation stations (*)

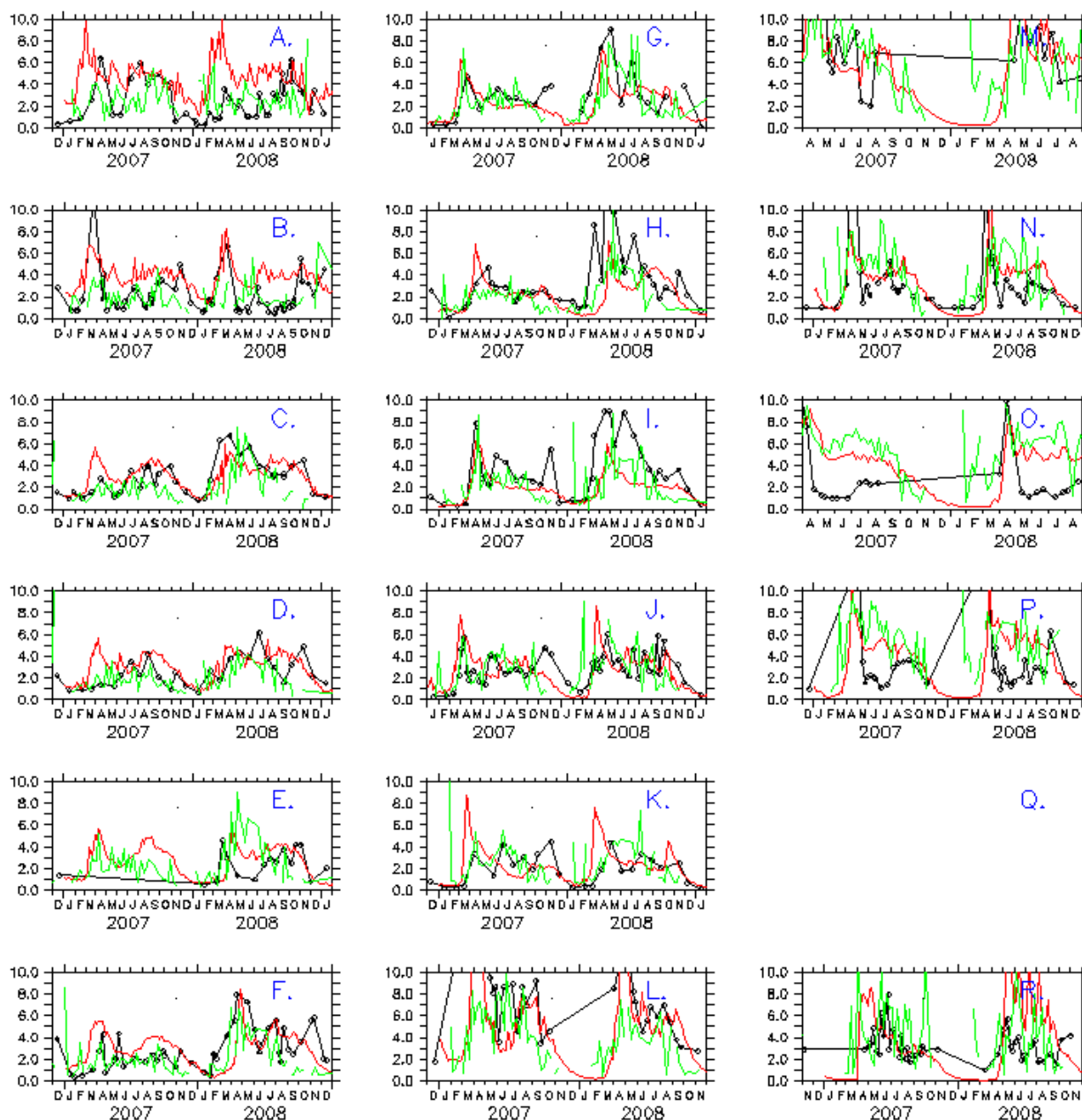


Figure 2. Comparison of seasonal variation of Chlorophyll *a*, unit: mg m^{-3}

2. Comparison of spring bloom timing in years 2007 and 2008

The spring bloom timing is defined as the date when the chlorophyll *a* reaches the maximum between March 1 to May 1. The results of observations, modeled results and satellite results are showed in Figure 3, where black squares stand for observations, red triangles for modeled results and green cycles for satellite results, and the station sequence (A-R) is defined in Figure

1. The values represent the days later than April 1. A negative value means the days earlier than April 1. The mean error of modeled spring timing relative to observation is 11.5 days, while the satellite mean error is 14.0 days.

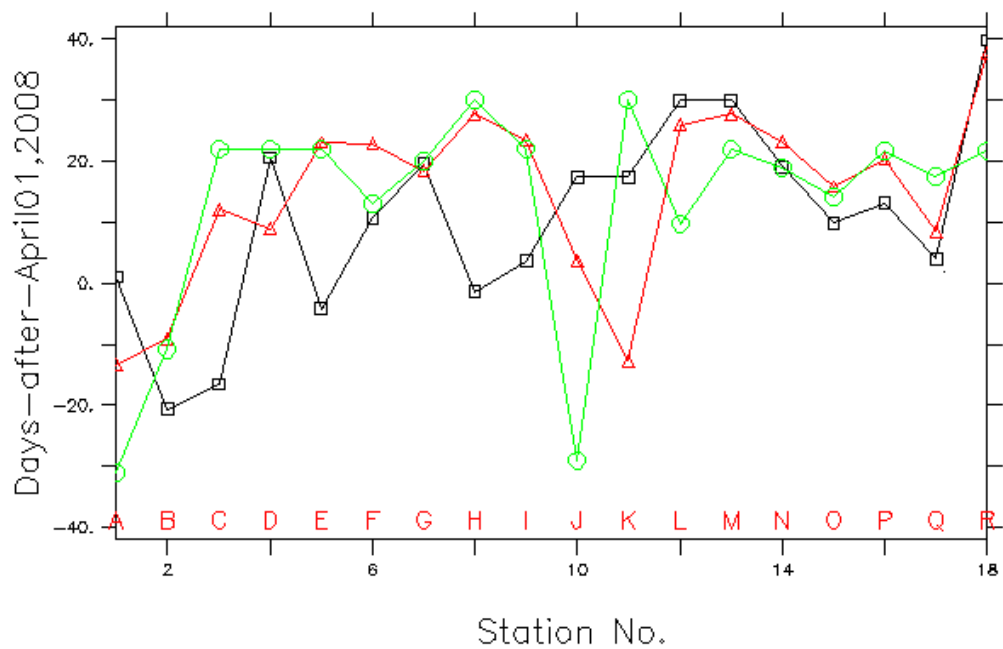
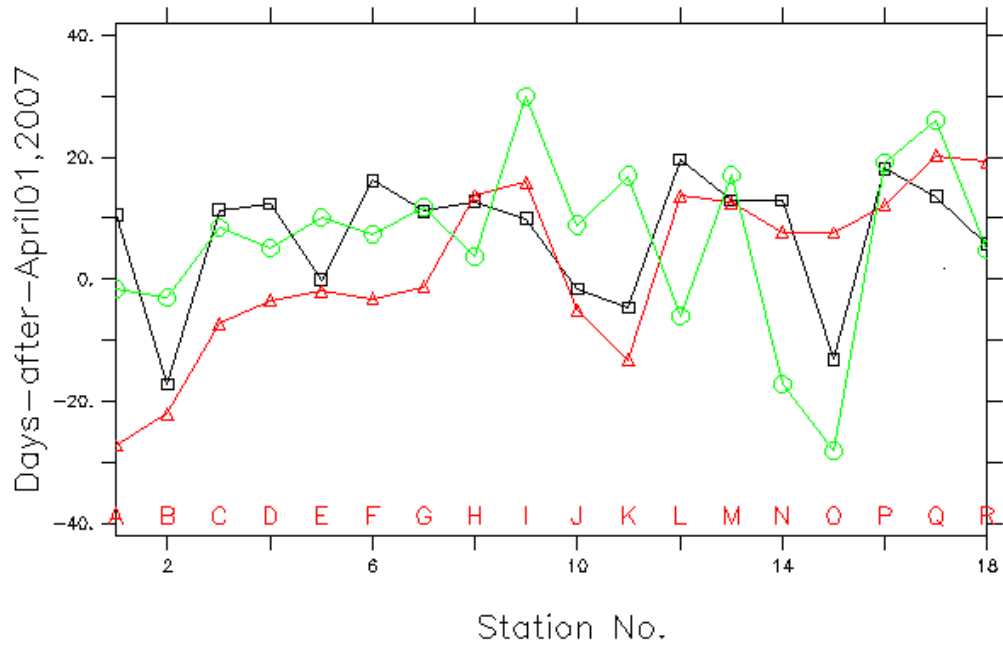


Figure 3. Comparison of spring bloom timing, unit: days since April 1.

3. Comparison of horizontal pattern of Chlorophyll *a*

The comparison of horizontal pattern of Chlorophyll *a* between satellite products and model results are showed in Figure 4 for year 2007 and Figure 5 for 2008.

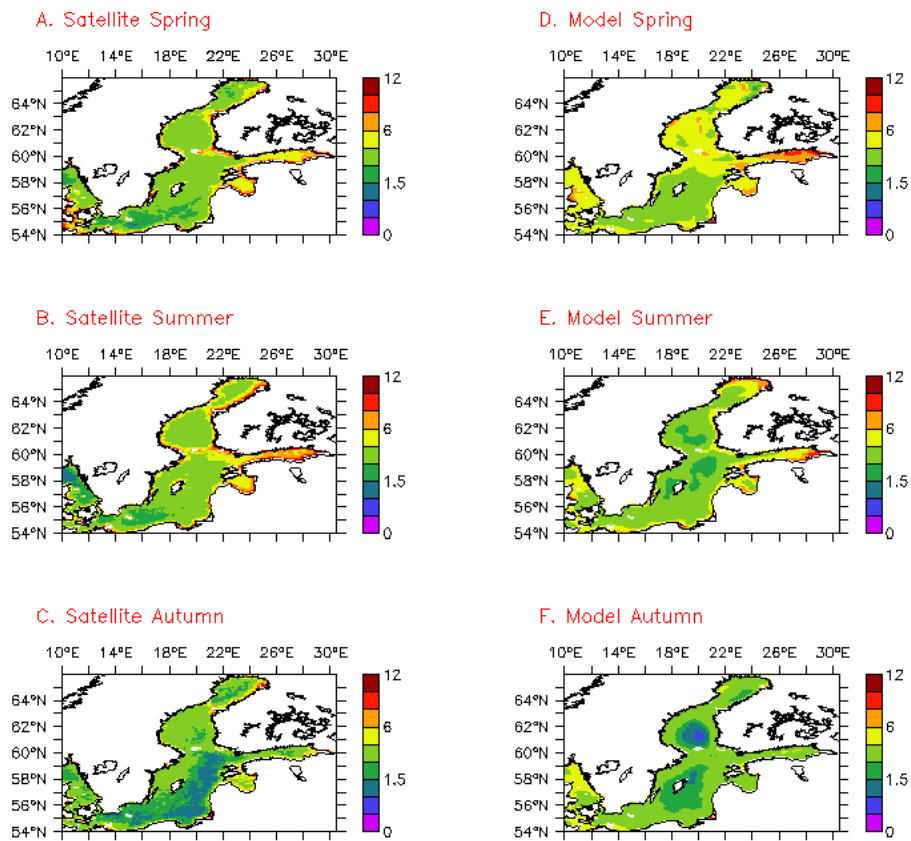


Figure 4 Comparison of surface Chlorophyll *a* between satellite products and model results in 2007, Unit: mg m^{-3} .

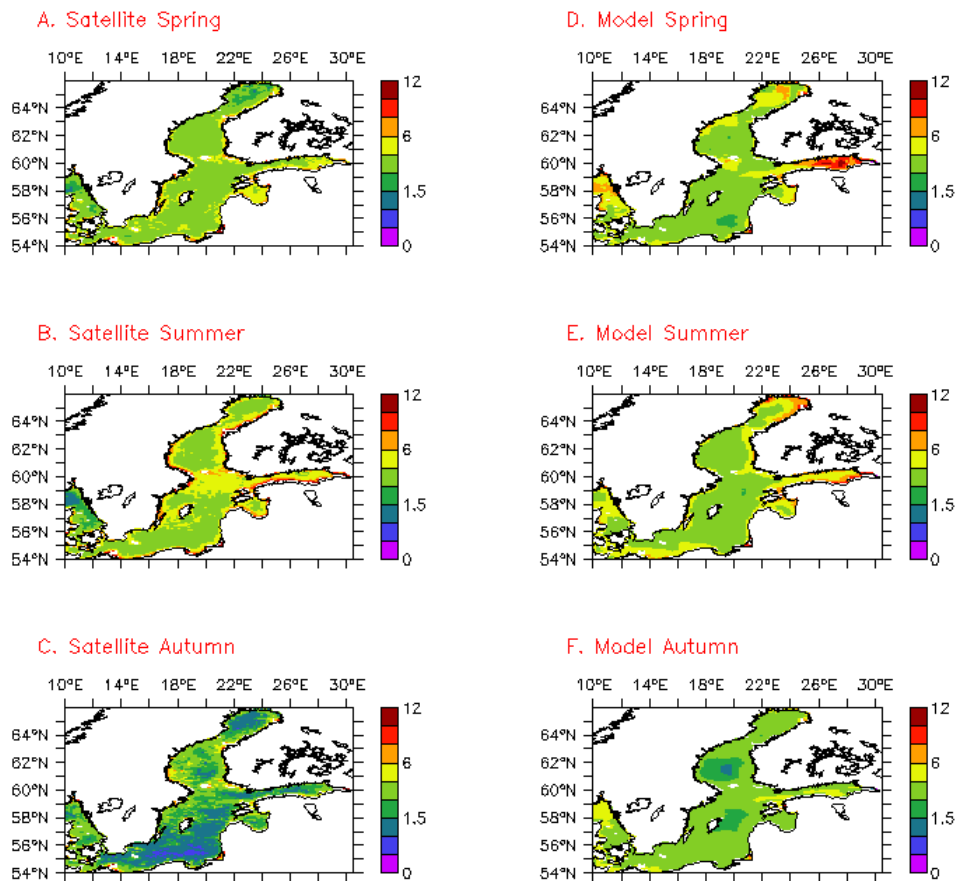


Figure 5 Comparison of surface Chlorophyll a between satellite products and model results in 2008, Unit: mg m^{-3} .

4. Data description

The observations are downloaded from the International Council for the Exploration of the Sea (ICES) (<http://www.ices.dk/indexfla.asp>). The satellite data are from the DMI operative products (<http://marcoast.dmi.dk/chlorophyll.php>) of MarCoast project. The model results are from the DMI operative models (Wan et al, 2011; 2012a, 2012b) of MyOcean project.

Reference:

Wan, Z., Jonasson, L., and Bi, H.: N/ P ratio of nutrient uptake in the Baltic Sea, *Ocean Sci.*, 7, 693–704, 2011.

Wan, Z., Bi, H., She, J., Maar, M., and Jonasson, L.: Model study on horizontal variability of nutrient N/P ratio in the Baltic Sea and its impacts on primary production, nitrogen fixation and nutrient limitation, *Ocean Sci. Discuss.*, 9, 385-419, doi:10.5194/osd-9-385-2012, 2012.

Wan, Z., She, J., Maar, M., Jonasson, L., and Baasch-Larsen, J.: Assessment of a physical-biogeochemical coupled model system for operational service in the Baltic Sea, *Ocean Sci. Discuss.*, 9, 835-876, doi:10.5194/osd-9-835-2012, 2012.