

***Interactive comment on* “Structure of
phytoplankton (Continuous Plankton Recorder
and SeaWiFS) and impact of climate in the
Northwest Atlantic Shelves” by S. C. Leterme and
R. D. Pingree**

S. Losa (Referee)

sloza@awi-bremerhaven.de

Received and published: 1 December 2006

The authors analyze phytoplankton seasonal evolution and interannual variability observed in the North Atlantic Shelves Province during the Continuous Plankton Recorder (CPR) monitoring program over the period of 1995–1998. For the analysis, the authors implement few non-parametrical distribution-free statistics criteria and the cumulative sums method (to detect any trends), trying to determine any association or correlation with the physical ocean dynamics (variability of sea surface temperature and sea surface high) as well as with North Atlantic Oscillation (NAO) indexes. The authors also

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

investigated how well the measured Phytoplankton Colour Indexes (PCI) agree with SeaWiFS colour data. The meaning of the work- with respect to satellite color data calibration by in situ observations,- has already been mentioned by the first reviewer (Brander, 2006).

I think the paper fits the journal quite well and can be published. I do however have a concern which the authors may want to address. Indeed, it is just a question which came to my mind while I had been reading the paper. (Maybe, it happened due to the fact that I am a modeller and got used to think and write in a slightly different categories and terms).

Main concern:

The authors discuss the impact of different water masses movement (entrainment and crossing over the region of interest) on the phytoplankton distribution. In particular, the authors emphasize that the Labrador Sea Water changing flow influences to a large extend the observed phytoplankton "climate" (or dare we say, interannual variability). However, what I would like to see at the paper, it is a more detailed description of and/or discussion on the the investigated physical-biological interaction mechanism itself. For instance, the following rather interesting event: the very pronounced winter 1996 phytoplankton bloom and no spring 1997 bloom on Georges Bank. The authors do note that "the changes in sea water characteristics (temperature, salinity, nutrient level, etc..) following the inflow of LSSW might have modified the timing and development of the spring bloom and the density stratification on Georges Bank". But what was exactly going on? Seemingly, that autumn - early winter, the surface water on Gearges Bank was colder and less saline, since, as the authors emphasized, responding the winter 95/96 negative NAO conditions, the Labrador Subarctic Slope Water (LSSW) could reach the Scotian Shelf by that time. In autumn, the upper mixed layer (UML) could be deep enough to initiate nutrient supply for starting the phytoplankton bloom. However, for some reason (?), the UML should be quite shallow in winter to increase or turn on the phytoplankton light limitation and produce the observed high winter phytoplankton

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

concentrations. It might support zooplankton 'overwintering', and spring phytoplankton appeared to be under zooplankton grazing control. Or.. some other zooplankton taxa might be advected with the Labrador Sea Water? Or.., in the 1997 spring, the upper mixed layer was exceedingly deep and spread off the phytoplankton production over the depth..? If the authors know the full story, it would be nice to hear(read) it.

Minor comments:

The 2 month lag monthly mean PCI - NAO 95% reliable positive correlation is observed only at 50% of the stations;

p.1882, line 17 – "This period..." following the previous sentence (line 18), sounds confusing.

Few technical comments:

p.1886, lines 2-3 – whether it is reasonable to use "e.g. marked B on Fig.13" when giving the reference to Leterme and Pingree (2006);

p. 1879, line 9 – should it be "between monthly PCI and NAO" instead of "between PCI and monthly NAO";

p. 1879, line 23 – '+' and '-', should be opposite;

p. 1880, line 5 – between 'x' and 'is' should be a space;

Fig. 6D - something wrong with the time axis.

Interactive comment on Ocean Sci. Discuss., 3, 1871, 2006.

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)