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Ocean Science Discussions

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

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This paper extracts a substantial and novel harvest of interpretations concerning the drivers of seasonal, annual and geographic variability of phytoplankton abundance from a fairly modest amount of in situ and remotely sensed observation. The in situ observations are from a very simple Phytoplankton Colour Index (PCI) applied to sample silks collected monthly (1995-1998) with the Continuous Plankton Recorder from routine ship-of-opportunity routes. The remote sensing provides SST, Sea Level Anomalies (SLA) and chlorophyll from Sea WiFS. One of the aims was to investigate the con-

sistency between PCI and SeaWiFS measurements in this area. The analysis shows that the two are consistent, but do not measure exactly the same thing. The differences between them can be interpreted. This is an important and encouraging result which can be added to a number of similar analyses (e.g. Raitsos et al. 2005). The in situ and remotely sensed observations complement each other well and demonstrate the value of routine, consistent monitoring, whether the technology is advanced or extremely simple. The other aims were to investigate the interannual, seasonal and geographic patterns of phytoplankton for the area of shelf and open ocean from Cape Cod to Newfoundland and to relate these to possible physical drivers (SST, Labrador Sea Water, eddies). I was concerned whether the paper said enough about climate to justify the title. They show that phytoplankton respond to the NAO with a lag of 1-2 months and attribute this to the effect of the NAO on the flow of Labrador Subarctic Slope Water (LSSW) relative to Atlantic Temperate Slope Water (ATSW). This is a well established relationship and it is useful to have additional evidence of the biological effects. The methodology which is used to describe the spatial and temporal patterns and to analyse the relationships with physical drivers is clear, simple and quite adequate to support the conclusions. Inevitably a large number of acronyms are required, but there seems to be some redundancy (e.g. SLA is presumably the same thing as anomaly in SSH. Do we need both?) In sum I think this is a useful, clear and interesting paper which shows the consequences of interaction of physical forcing at several scales on phytoplankton biomass. It gives us grounds for optimism that we are getting better at monitoring and interpreting the variability in primary producers, which should provide a better basis for interpreting changes in marine ecosystems. I guess there has to be a question of the extent to which one can generalise from the shelf areas being looked at here. The juxtaposition of ATSW and LSSW generates some of the strongest horizontal temperature gradients on the planet and the heat budget of the shelf area is dominated by the interplay between them, rather than by surface flux.

I have no specific negative remarks concerning the evaluation of the paper. I raised the question about the inclusion of “climate” in the title, but I think it is justified. There

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is repetition in the description of PCI (p1874 lines 17 and 25) and Hovmoller diagrams (p1876 lines 1 and 22)

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