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## ***Interactive comment on “Parameterization of vertical chlorophyll $a$ in the Arctic Ocean: impact of the subsurface chlorophyll maximum on regional, seasonal and annual primary production estimates” by M. Ardyna et al.***

**Anonymous Referee #1**

Received and published: 22 March 2013

### Overview

This paper describes a large dataset of pan-Arctic observations of Chl  $a$ . The data described here were used to determine average Chl  $a$  profiles for estimating integrated primary production from surface Chl  $a$ . As the magnitude and contribution of the subsurface Chl  $a$  maxima is still unknown this is an important effort towards quantifying its effect on seasonal and annual productivity. This is a well written paper and just needs a few points clarified.

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## Abstract

Line 6: missing “in” nor accounted for in the primary”

## Introduction

Line 29: a powerful mean? Should this be a powerful medium? or means?

## Methods

Line 93: Did all the profiles have light depths associated with them. If not how did you decide whether the last depth sampled was at or below the euphotic depth?

Line 94: Is Zbot the depth of the water column?

Line 98: A better sentence would be “Because of the difficulty in accessing the Arctic Ocean”

Line 149 to 159: I am a little confused about this paragraph. Are the data separated into pre-bloom, post-bloom and winter purely by the calendar month? Irrespective of the location or ice cover? I ask because a location with complete ice cover in April or May would not be characterized as in the post-bloom phase. Also is there no bloom phase? Later in the paragraph it is stated that the temporal threshold between pre-bloom and post-bloom was defined as the time period when surface Chl a is highest, so were the periods calculated individually for each station? I need a little more clarity in this section.

Line 178: Should read ‘A spectrally-resolved model” not spectrally-resolve, just missing the “d”.

## Results

Line 394 to 399: Looking at the plots in fig 6 and comparing them with those time series in fig 8, I don’t see the same features. The well-defined SCM at low surface concentration is not there.

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Line 421: This sentence is confusing. “Thereafter, the consequences of low during the post-bloom (when  $>0.7 \text{ mg m}^{-3}$ ) and winter periods could explain, to a lesser degree, PP overestimations.” Can you clarify for me, why low surface Chl leads to overestimations?

Line 427: I was unable to find 40% in table 6.

Line 489: You can also use the PP estimate from Codispoti et al 2013 Progress in Oceanography which is based on nutrient drawn down.

Line 565: I could not find table 7.

Figures

Figure A1: I did not see this figure referenced in the appendix text.

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Interactive comment on Biogeosciences Discuss., 10, 1345, 2013.

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