

Fig. 9. Spectral dependency of b_{bp} (γ slope) as a function of (A) [Chl] or (B) $b_{bp}(555)$, for BOUSSOLE and PnB. (A) The number of points and the parameters of a linear fit (thick solid line) on the log-transformed data are indicated, where the dotted line is the Huot et al. (2008) relationship (noted HU08) the dashed line is from the Morel and Maritorena (2001) model (MM01), the dotted-dashed line is from eqs. 12 and 15 in Stramska et al. (2003) (ST03), and the thin solid line from fig. 7a in Loisel et al. (2006) (L06). (B) The continuous and dashed curves are the two relationships proposed by Stramska et al. (2006) (ST06; their fig. 11b) from data collected in the north polar Atlantic.

In the winter of 2006–2007, [Chl] was between ~ 0.5 and 1 mg m^{-3} , c_p was $\sim 0.1 \text{ m}^{-1}$, c_p^* was very low at $\sim 0.15 \text{ m}^2 (\text{mg Chl})^{-1}$, and the population of particles was dominated by phytoplankton ($a_p : a_p > 0.9$). The relative contribution of nano-phytoplankton was stable at 45%, and the relative contribution of pico-phytoplankton decreased from 45% to 35%, while that of micro-phytoplankton increased from 10% to 20% (from December 2006 to January 2007).

These data indicate that the situation in January–February 2006 (deep mixing), with low backscattering and very low particle load and chlorophyll concentrations, corresponds to a diluted population of particles essentially including detritus (low $a_p : a_p$ ratio) and in which phytoplankton were moderately photoadapted. This regime probably derives from the intense vertical mixing. On the contrary, the situation in December 2006–January 2007, with low backscattering and higher particle load and chlorophyll concentration, corresponds to a highly photoadapted phytoplankton population (adaptation to low light with very low c_p^*) with a minimal detrital contribution (high $a_p : a_p$ ratio).

The micro-phytoplankton contribution is considerably smaller (15%) during the winter of 2006–2007 as compared to the previous winter ($\sim 30\%$). Pico-phytoplankton, accordingly, increased. This change in the proportion of major size classes has no noticeable effect on the magnitude of b_{bp} . These small changes in b_{bp} may equally show that

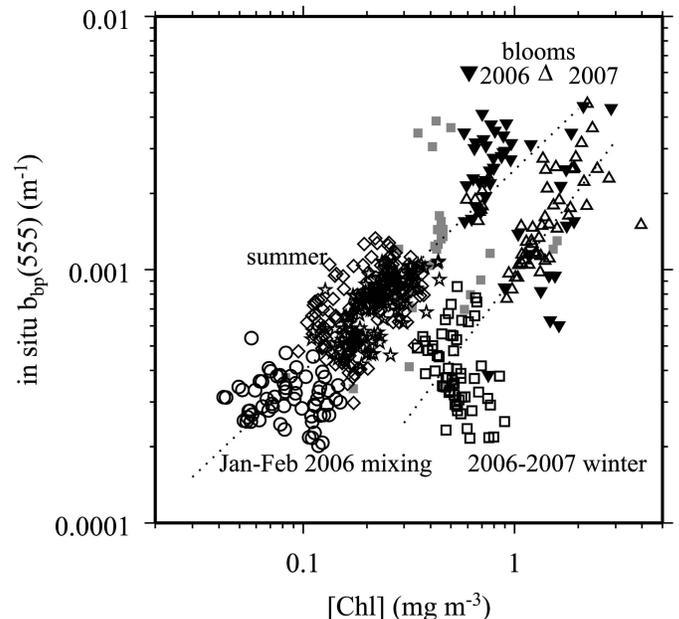


Fig. 10. $b_{bp}(555)$ as a function of [Chl] for BOUSSOLE only. Data are reproduced from Fig. 5A (see discussion for the meaning of symbols). Gray squares are data not falling into any of the categories identified on the figure. The two dashed lines are simply for illustration; they are not best-fit lines.