Major imprint of surface plankton on deep ocean prokaryotic structure and activity

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Figure S1. Differences in phytoplankton community composition at the deep chlorophyll maximum (DCM). Cell abundances at the DCM of different eukaryotic and photosynthetic prokaryotic plankton groups across stations, measured by either inverted microscopy (a) or flow cytometry (b). The numbers on top of each bar indicate the depth at which the DCM was located and from where the samples were collected.
Figure S2. Spatial patterns in the composition of the fluorescent dissolved organic matter (FDOM) pool. (a) Composition of FDOM based on four fluorescence components determined using parallel factor analysis (PARAFAC): Components C1 and C2, related to refractory or humic material, and C3 and C4, associated with more biolabile microbially-produced protein-like DOM (for details see Catalá et al. 2016). Data are expressed as maximum fluorescence of each of the four PARAFAC components in Raman units (RU). (b-d) Principal component analysis (PCA) of the sampled sites based on the fluorescence intensity of the four components (C1-C4). Shape indicates the ocean, and sites are color-coded depending on ocean layer (b), station (c) and mean annual Chl concentration (mg m\(^{-2}\)) of each overlying Longhurst province (Longhurst_Chl, d).
Figure S3. Similar responses of surface and bathypelagic particle-attached communities to spatial variations in surface biotic conditions. Comparison of the R coefficients of the significant Mantel correlations (shown in Figure 3) between variations in surface biotic variables and dissimilarity in communities attached to larger particles (3-200 μm) from surface waters versus the R coefficients of Mantel correlations performed with a) DCM, b) mesopelagic and c) bathypelagic prokaryotic communities. The colors indicate the individual surface variables considered in each Mantel correlation: mean annual chlorophyll-a concentration and primary production of each overlying Longhurst province (Longhurst-Chl, Longhurst-Prod), measured in situ chlorophyll-a concentration in surface waters (Surface Chl), and surface abundances of the different micro-, nano- and pico-planktonic groups. Note the highly similar pattern shown by surface and bathypelagic particle-attached prokaryotic communities, which respond equally to the different surface biotic factors, whereas prokaryotic communities from DCM and mesopelagic do not mirror as strongly the responses of their surface counterparts.
Figure S4. Role of *in situ* physico-chemistry and surface biotic factors on shaping FDOM quality at each ocean layer. Heatmap showing the R coefficients of the Mantel correlations between differences (Euclidean distances) in FDOM composition (i.e., intensity of the fluorescent components C1, C2, C3 and C4) across stations and spatial differences in individual geographic (Geo.) or local environmental variables measured at each depth, or in surface FDOM composition. Only R coefficients of significant correlations are shown (p<0.05-0.001). n.a., not applicable. No significant correlation was found between differences in FDOM composition and the surface biotic variables considered.
Figure S5. Correlation between the observed Bray-Curtis dissimilarity in bathypelagic prokaryotic communities from each size fraction (a-e) vs. that predicted by the Generalized Dissimilarity Models (GDM) shown in Figure 4.
Figure S6. Proportion of chemoautotrophic metabolisms among endemic and surface-related bathypelagic taxa. a) Relative contribution of autotrophic metabolisms to total functions inferred from the taxonomic composition using FAPROTAX (see Methods) between the endemic and the surface-related components of bathypelagic prokaryotic assemblages. Asterisks indicate significant differences (p<0.001) between both categories (Wilcoxon test). b) Relative contribution of autotrophic metabolisms to total functions within both endemic and surface-related OTUs along a gradient of average annual chlorophyll-a concentration in the overlying Longhurst provinces for each of the five size fractions. n.d. indicates that no potential autotrophic metabolism was detected.