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## The role of anoxygenic phototrophs in the Baltic Sea

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Both oxygenic and anoxygenic phototrophic bacteria (OPB and APB, respectively) are widely distributed in the ocean and play significant roles in carbon cycle and marine productivity. These organisms capture light as energy source via chlorophyll or bacteriochlorophylls-based photosystems. While OPB are relatively well studied, information on APB is rather scarce although they have been shown abundant in some ocean ecosystems and may play an important role in oxygen depleted environments. Here, we investigate the spatial profile of OPB and APB, gene abundance and expression of the key functional marker gene *pufM* (APB specific photosynthetic reaction center subunit M), in one fjord and three basins of the Baltic Sea using 16S rRNA amplicon sequencing and qPCR. Among the microbial community, abundances of OPB and APB were found to be similar thus emphasizing a potential importance of APB, with APB representing 1.6-17.5% and OPB representing 0.5-20%. Among APB, we identified eleven different orders, with *Rhodobacterales* being quantitatively dominant. The identified seven orders of OPB were dominated by *Synechococcales*. OPB were more abundant than APB in surface waters (<8m), while APB were comparably more abundant in deeper waters. Besides a depth-dependent distribution, we observed an impact of salinity on the distribution of APB and OPB, both of which being suggestive of distinct niches for those primary producer clades. *pufM* gene abundance ranged from  $10^4$  to  $10^9$  copies/L, with highest counts detectable in the mixed layer (<40m), however, even in deeper waters where gene abundances decreased APB *pufM* gene expression was high with up to  $10^4$  copies/L. These results indicate APB may play a more important role in marine primary productivity which has been underestimated before.