



## **Modelling the ecosystem dynamics at the Iceland-Faeroes Front: the effect of vertical advection and diffusion on nutrient supply to the euphotic zone**

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We examine the effect of vertical advection and vertical diffusion on the supply of nutrients to the euphotic zone at the Iceland Faeroes Front (IFF), which was put into an oligotrophic context. This is done using a 3D high resolution coupled biological-physical model, that has previously been used to reproduce in situ and satellite observations of physical and biological variability at the IFF. The results show that, while instantaneous vertical advective fluxes of nutrients can be much larger than vertical diffusive ones, over a period of days the latter act consistently to supply nutrients to the euphotic zone. In contrast, the spatially and temporally varying nature of the vertical velocity field means that there is no consistent vertical advective flux of nutrients. This suggests that for real "messy" complex flows, such as the one modelled here, ageostrophic vertical velocities induced by eddies and frontal meanders may not play as important a role in supplying nutrient to the euphotic zone, and so enhancing biological production there, as has previously been thought.