



## **Impact of surface mixed layer on ocean biological carbon pump.**

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Ocean vertical mixing and biological carbon pump changes are regularly proposed as mechanisms potentially responsible for atmospheric carbon modifications over long time scales. These two phenomenons are not independent from each other. Indeed, the vertical mixing constrains the availability of the two essential elements of the primary production (PP, base of the biological pump): light and nutrients. This availability changes with latitude: at low latitudes, nutrients are currently limiting the primary production when at high latitudes nutrients utilization is incomplete.

We investigate, here, the influence of the surface mixed layer (ML) on the atmosphere-ocean carbon exchanges through its impact on the biological carbon pump.

To realise this study, we implemented a ML scheme into the Grid Enabled Integrated Earth system model (GENIE) coupled with a biogeochemical model (BIOGEM).

The ML scheme selected is derived from the Kraus-Turner's approach (1967). Water and the contained tracers are mixed from the surface to a level at which no more energy is available for mixing.

The results are analysed in terms of PP, export production and ocean-atmosphere fluxes. The role of ML is studied both in terms of intensity and repartition of these fluxes according to the latitude.