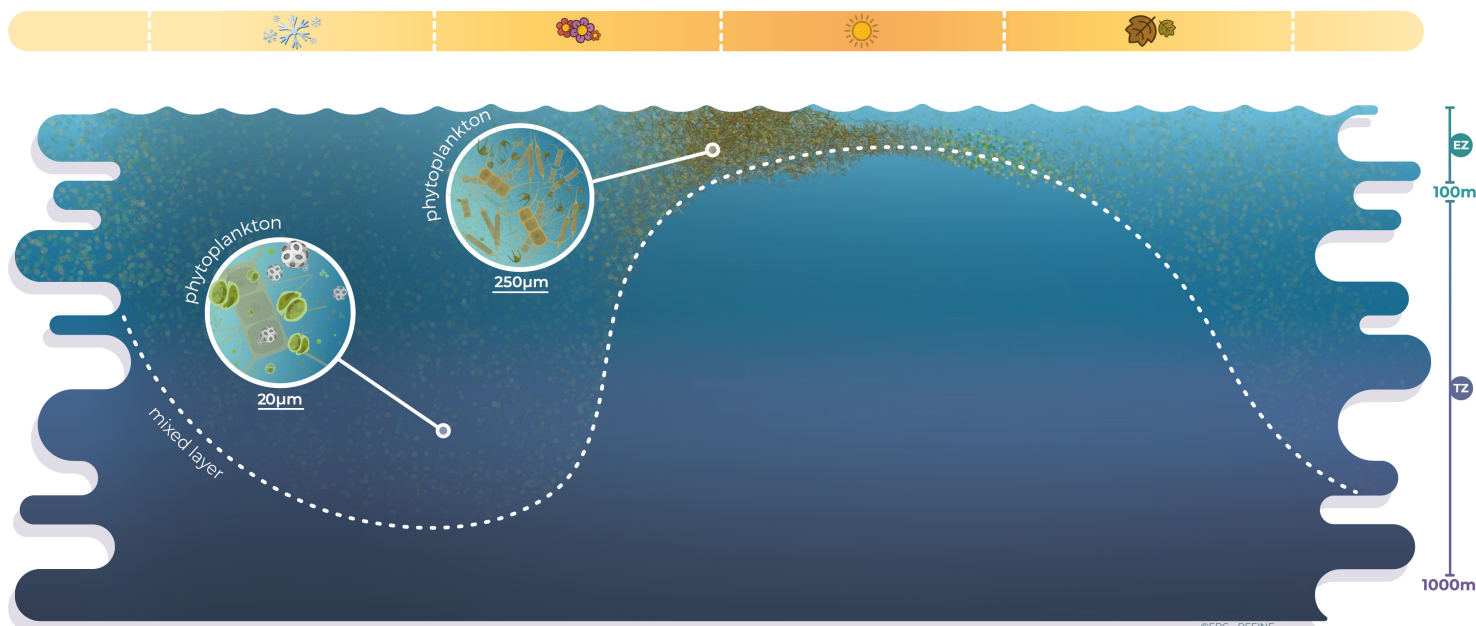


THE GRAVITATIONAL PUMP

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The phytoplankton biomass cycle: typical seasonal evolutions in a temperate or subpolar environment.

The depth domain covers the upper Euphotic Zone (EZ: ~0-100 m on average) and the Twilight Zone (TZ: ~100 m-1000 m on average). The dotted white line identifies the bottom of the mixed layer which presents a marked seasonal evolution: deep in winter (up to 1000 m in some areas), shallow in summer, and transitioning between these two extremities in spring and fall.

In winter, despite the repletion of nutrients in the mixed layer, reduced light and temperatures limit phytoplankton growth. Phytoplankton biomass, dominated by flagellate-type nano-phytoplankton, remains low.

In contrast, spring stratification offers the conditions required for phytoplankton growth: nutrients are abundant and the light environment becomes favorable. As a result, a spring bloom develops, mainly characterized by micro-sized communities, generally diatoms.

Around mid-summer, a deep phytoplankton maximum eventually develops below the surface, generally at the level of the mixed layer where both light and nutrient conditions are suitable.

Fall storms and subsequent cooling contribute to destratification and the progressive establishment of conditions less apt for phytoplankton growth.