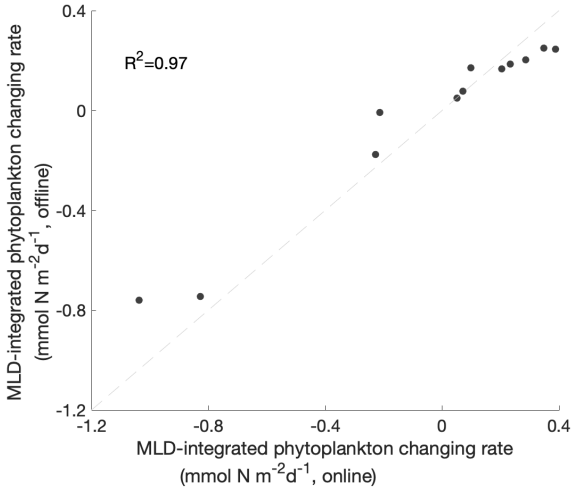

Figure R2.1: Comparison of the on- and offline calculated tendency of ML integrated phytoplankton biomass (mmol N m^{-2} d^{-1})

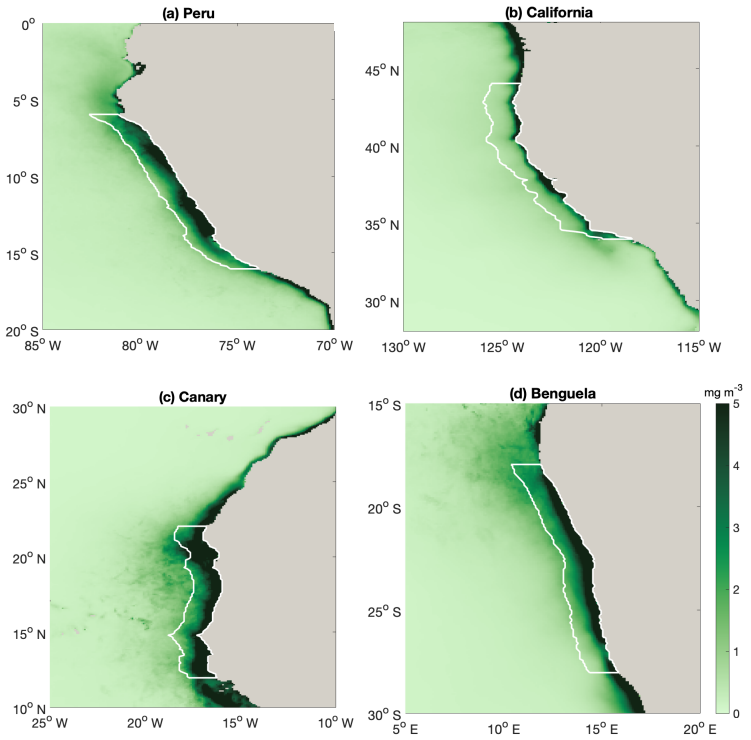

Figure R2.2: Maps of annual mean surface chlorophyll ($mg\,chl\,m^{-3}$) that show the EBUS regions that we focus on; white lines highlight the regions that we average over in our analyses.

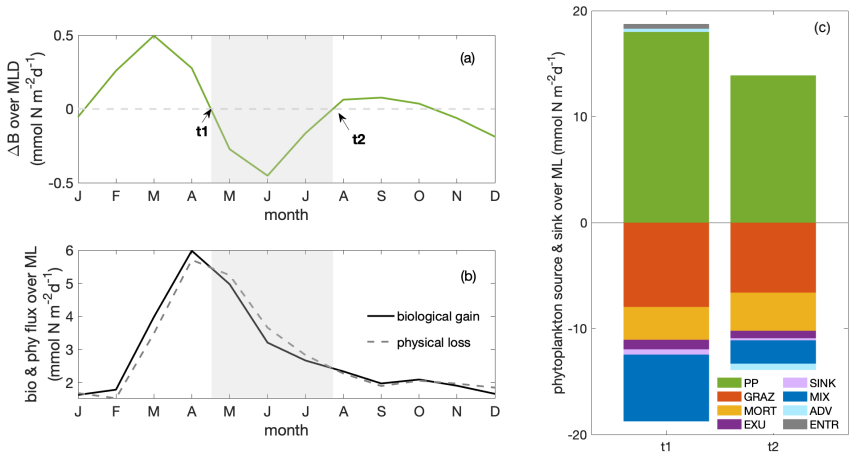

Figure R2.3: Seasonal cycles of (a) total phytoplankton biomass change (ΔB; in mmol N m^{-2} d^{-1}); gray shading indicates the decline phase, with t1 and t2 marking the beginning and end of the decline phase; (b) phytoplankton fluxes combined to net biological gain (bio) and net physical loss (phy, in mmol N m^{-2} d^{-1}, as shown in Eq. 1 plus the entrainment and detrainment introduced by the temporal variation of the MLD); (c) Stacked bar plots of balancing budgets at t1 and t2. pp stands for primary production; graz for consumptive mortality; mort for natural mortality; exu for exudation; sink for sinking; mix for mixing; adv for advection and entr for entrainment. Fluxes are distinguished as sources (positive values) and sinks (negative values) of phytoplankton biomass, with the sum of all source and sink terms balancing at times t1 and t2. All fluxes are integrated over the MLD.

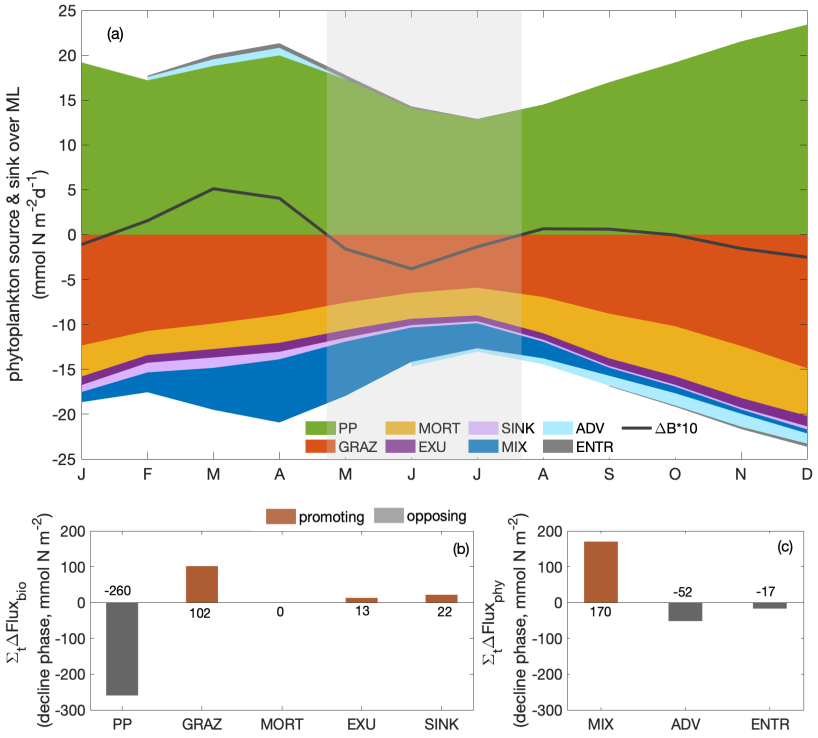

Figure R2.4: (a) Seasonal cycle of phytoplankton source and sink processes (in color, stacked), as well as phytoplankton biomass change (ΔB, multiplied by a factor of 10; solid line). Bar plots of the integrated change over the decline phase due to (b) biological fluxes and (c) physical fluxes averaged over the focus region. Red shading indicates fluxes that promote an increase of ML-integrated phytoplankton biomass, and gray shading fluxes that oppose an increase. The magnitude of the integrated change is given as numbers on top/below the bars. pp stands for primary production; graz for consumptive mortality; mort for natural mortality; exu for exudation; sink for sinking; mix for mixing; adv for advection and entr for entrainment. All fluxes are integrated over the MLD.

$$\frac{\partial C}{\partial t} = BIO(C) + PHY(C) \tag{R2.1}$$

with $[BIO = PP - GRAZ - MORT - EXU - SINK; PHY = MIX + ADV]$