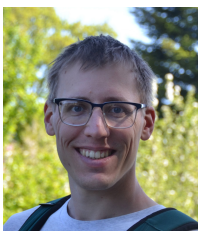


From alpha to beta ocean

The ocean plays a central role in the climate system by absorbing excess anthropogenic heat and carbon dioxide. Due to the large ocean stratification, vertical exchanges between the ocean interior and the surface are limited. The stratification is controlled by temperature in subtropical regions (alpha oceans) and salinity in polar regions (beta oceans). This thesis investigates the factors influencing the upper ocean stratification. The unique way the thermal expansion coefficient varies with temperature reduces buoyancy fluxes over cold waters. As a result, the contact regions between the ocean interior and the atmosphere are mainly located near the transition between the alpha and beta oceans. This thesis enlightens the central role of the TEC in modulating buoyancy fluxes and thereby controlling the alpha-beta ocean distinction.



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Exploring the role of surface buoyancy fluxes and seawater thermal expansion in setting the upper ocean stratification

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