



## Monthly Isopycnal/Mixed-layer Ocean Climatology (MIMOC)

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A monthly, isopycnal/mixed-layer ocean climatology (MIMOC) is presented, motivated by comparisons with other monthly ocean climatologies. All available quality-controlled profiles of temperature ( $T$ ) and salinity ( $S$ ) versus pressure ( $P$ ) collected by conductivity temperature-depth (CTD) instruments from the Argo Program, Ice-Tethered Profilers, and archived in the World Ocean Database are used for this climatology. MIMOC provides maps of mixed layer properties (conservative temperature  $\Theta$ , Absolute Salinity  $SA$ , and maximum pressure  $P$ ) as well as maps of interior ocean properties ( $\Theta$ ,  $SA$ , and  $P$ ) on isopycnal surfaces. A third product merges the two onto a pressure grid spanning the upper 1950 dbar and provides the more familiar potential temperature ( $\theta$ ) and practical salinity ( $S$ ). All maps are at monthly  $\times 0.5^\circ \times 0.5^\circ$  resolution, spanning from  $80^\circ\text{S}$  to  $90^\circ\text{N}$ . The optimal interpolation used to map the data incorporates an isobath-following component using a “Fast Marching” algorithm, as well as front-sharpening components in both the mixed layer and on interior isopycnals. Recent data are emphasized in the mapping. The goal is to compute a climatology that looks as much as possible like synoptic surveys sampled circa 2007–2011 during all phases of the seasonal cycle, minimizing transient eddy and wave signatures. MIMOC preserves a surface mixed layer, minimizes both diapycnal and isopycnal smoothing of  $\theta$ – $S$ , as well as preserving density structure in the vertical (pycnoclines and pycnostads) and the horizontal (fronts and their associated currents). It resolves water-mass features, as well as fronts and associated currents, with a high level of detail and fidelity.