Supporting Information for 'Enhanced ventilation in energetic regions of the Antarctic Circumpolar Current'

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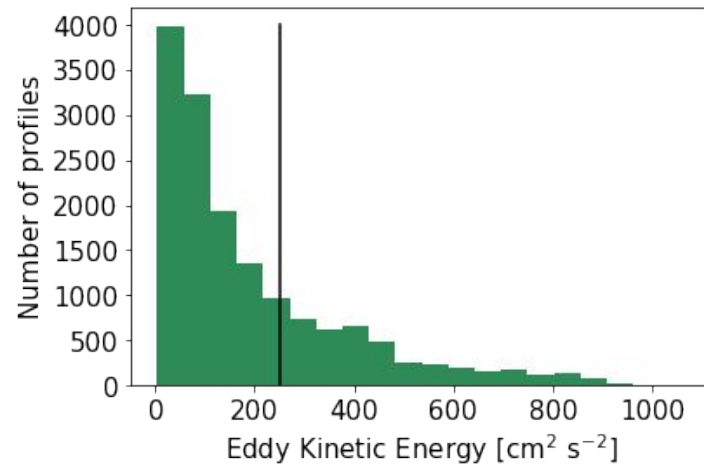## Contents of this file

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Figure S1. Histogram of the number of profiles by eddy kinetic energy (EKE, $cm^2\ s^{-1}$) in the defined Antarctic Circumpolar Current. Black line represents the boundary of "high" and "low" EKE used in this work.
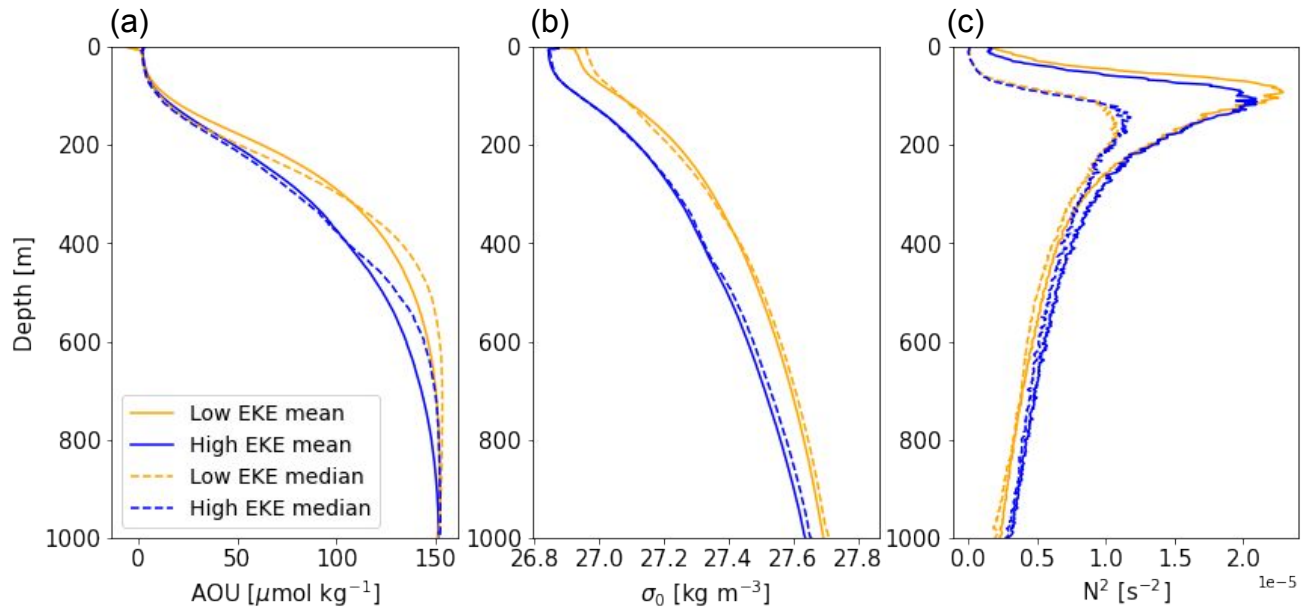
Figure S2. (a) AOU [μmol kg^{-1}], (b) Potential density, σ_0, [kg m^{-3}], and (c) Vertical stratification, N^2, [s^{-2}], with depth from all float profiles used in this study. For all panels, blue is high-EKE and orange is low-EKE. Solid lines are means while dashed lines are medians.
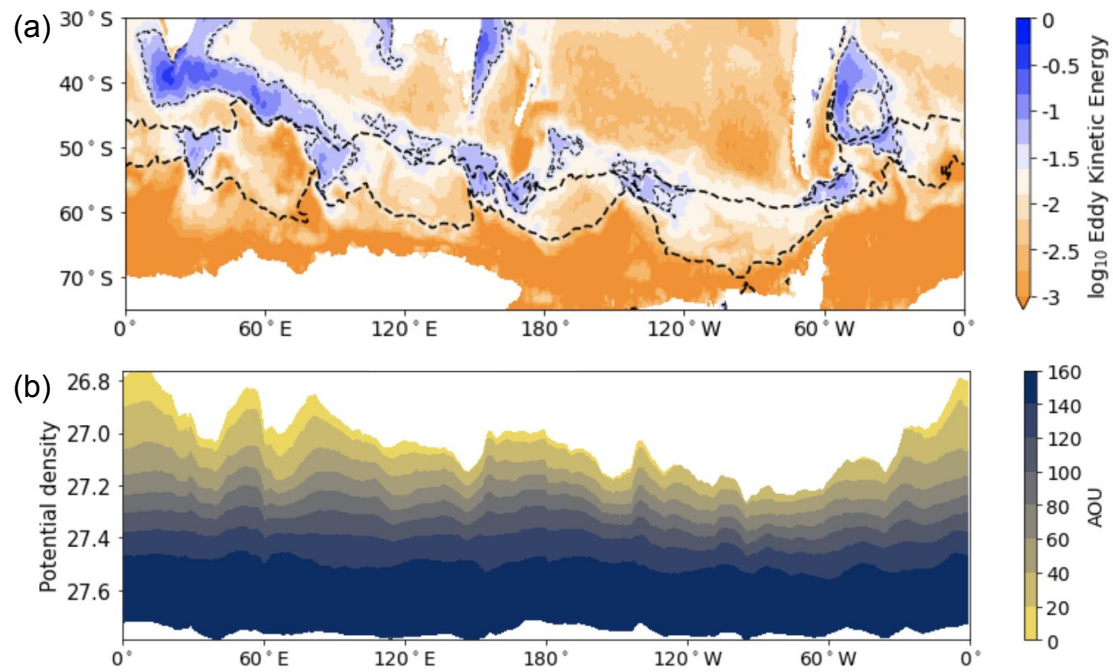
Figure S3. (a) Base-10 logarithm of eddy kinetic energy [$\log_{10}$ m^2 s^{-2}]. Black dotted lines illustrate the definitions used for ACC boundaries in this study. (b) Median AOU [μmol kg^{-1} on longitude plotted on potential density [kg m^{-3}].
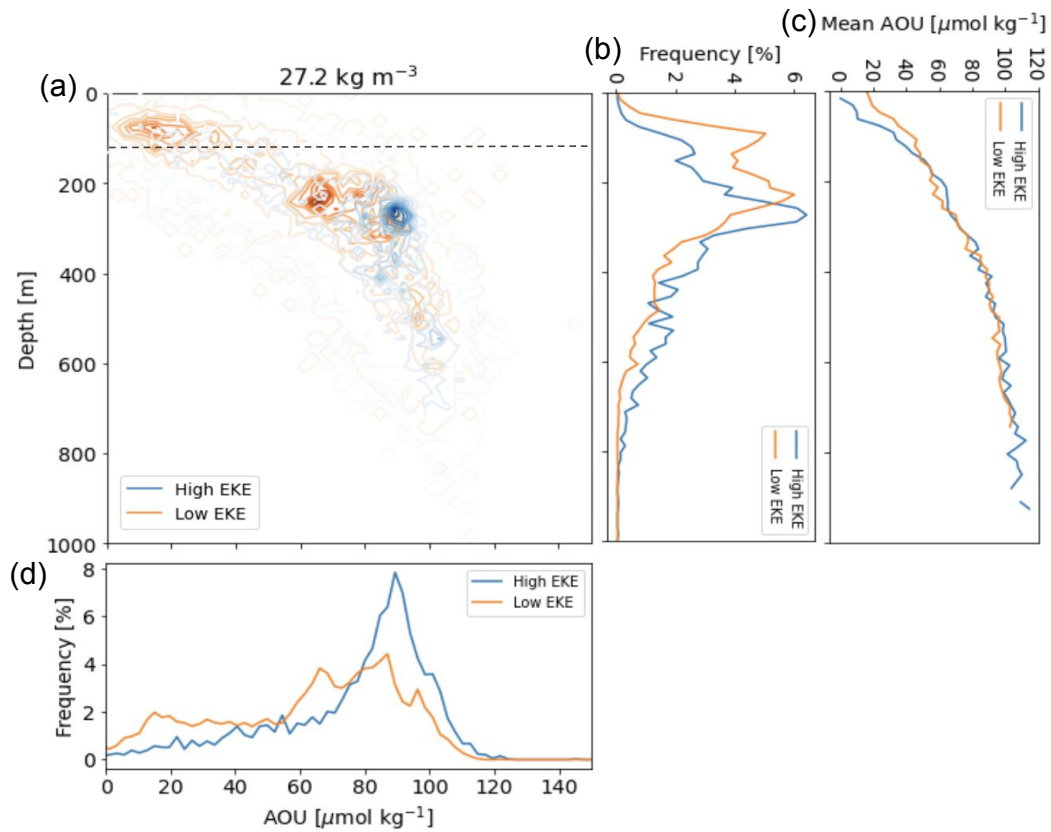
Figure S4. (a) Joint probability density function of all points on the 27.2 kg m^{-3} density surface in depth and AOU for low-EKE (orange) and high-EKE (blue) regions. Dotted black line represents the average mixed layer depth for both the high- and low-EKE regions and ΔAOU = 2 μmol kg^{-1}, Δz = 10 m. (b) Frequency histogram of depths of the 27.2 kg m^{-3} isopycnal in the ACC. (c) Mean AOU [μmol kg^{-1}] in depth of the 27.2 kg m^{-3} isopycnal in the ACC. (d) Frequency histogram of AOUs of the 27.2 kg m^{-3} isopycnal in the ACC. In (b)-(d), high-EKE regions are denoted in blue, low-EKE regions in orange.
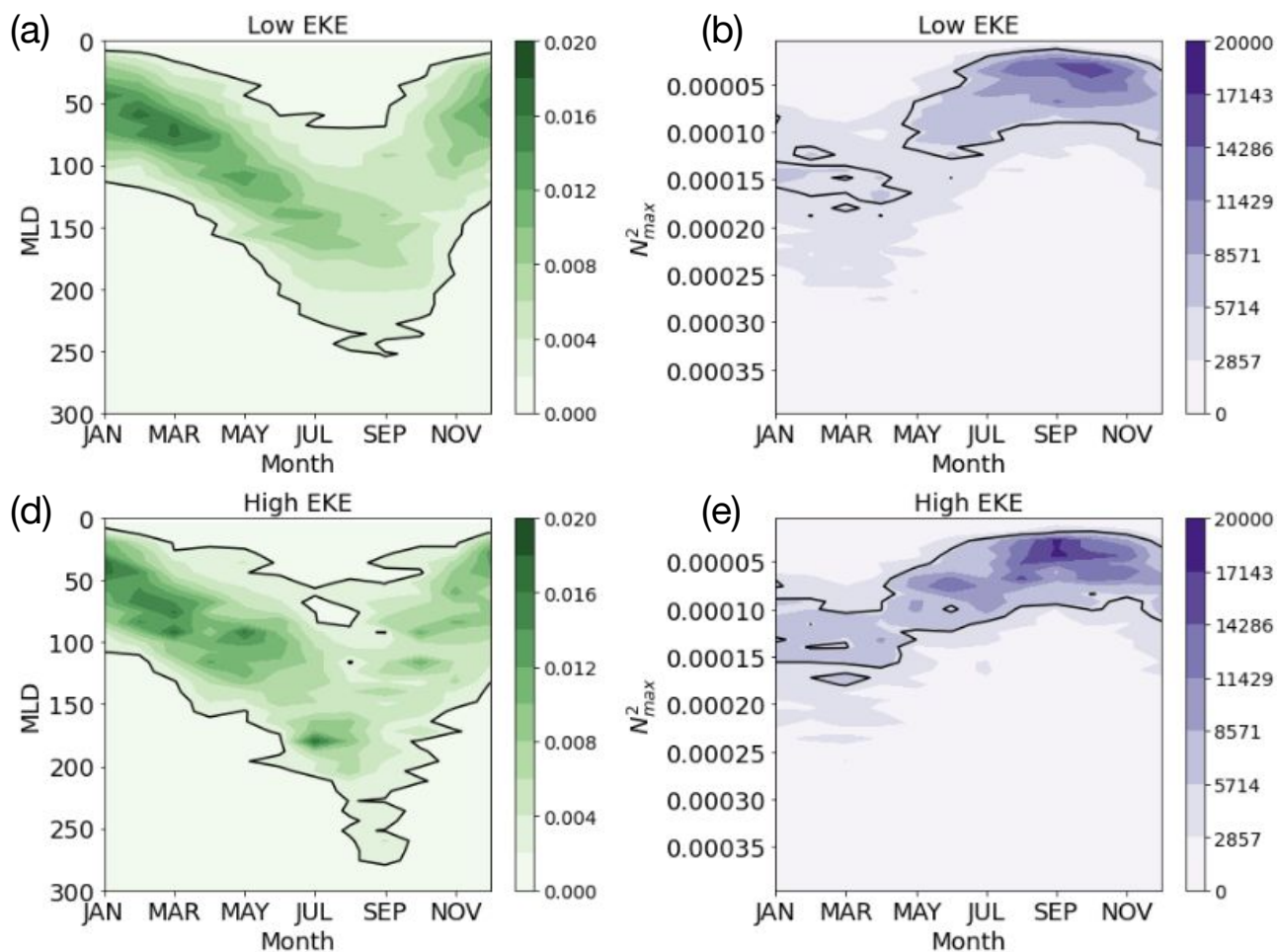
Figure S5. Joint probability density functions of month and (a) mixed layer depth [m] and (b) maximum stratification [s^{-2}]. (c) and (d) Same as (a) and (b) but for the high-EKE regions.