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A water mass analysis based method to determine anthropogenic carbon uptakes and transit times

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An inverse water mass analysis method is used to calculate anthropogenic carbon uptake in water mass formation regions from ocean circulation model output. The TROMP method uses a weakly non-linear under-determined system of mixing equations to generate relative water mass contributions and variations in selected source water properties, in this case DIC. A caveat of the analysis is its reliance on pre-defined definitions of pre-industrial DIC water mass concentrations. A relation between the delta pCO2 disequilibrium at the mixed-layer base and the atmospheric CO_2 content is used as a substitute for a static DIC definition. The anthropogenic carbon uptake in a source water region as well as mean water mass transit times are calculated.