

Consistency and fidelity of AMOC estimates from global ocean data assimilation products

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Ocean circulation affects the climate system by redistributing heat meridionally and modulating the air-sea heat flux. The Atlantic Meridional Overturning Circulation (AMOC) provides a major mechanism of meridional heat transport in the mid-latitude oceans. Measuring the AMOC and its associated heat transport using observations is difficult because of its basin-scale span and variability over a wide range of time scales. Ocean data assimilation (ODA) products provide a potential tool to monitor the AMOC state and to understand the related physical processes. However, the consistency and fidelity of the ODA products in representing the AMOC need to be investigated. As part of the CLIVAR/GODAE global ocean reanalysis evaluation effort, the state of AMOC estimated by over a dozen global ODA products from the US, Europe, and Japan are compared to determine the ability to detect climate signals and to define the observational accuracy needed to distinguish the quality of the products. AMOC state estimate derived from the RAPID-MOCHA in-situ array at 26N (2004 to 2007) is also used to evaluate the fidelity of ODA products. Because observational arrays such as RAPID-MOCHA are designed to monitor meridional volume transport but not meridional heat transport (which is more climate relevant), ODA products are used to identify the latitudes that are the most suitable to infer meridional heat transport based on meridional volume transport.