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Stochastic Stommel box models for the thermohaline structure of the oceans[1] DIBYENDU MANDAL, JEFFREY B. WEISS, Department of Atmospheric and Oceanic Sciences, University of Colorado, Boulder, BAYLOR FOX-KEMPER, Department of Geological Sciences, Brown University, Providence, ROYCE K.P. ZIA, Department of Physics and Astronomy, Iowa State University, Ames and Department of Physics, Virginia Tech, Blacksburg — Bistability of the thermohaline circulation of the oceans has been implicated in various climate shifts in the past. The origin of the bistability lies in ocean-atmosphere interactions, as can be understood from a simple, deterministic two-box model proposed by H. Stommel (1961). Because of the rapidly varying nature of the atmosphere relative to the ocean it is more appropriate to treat the interactions stochastically, but, studies of stochastic Stommel models have been limited. Stochastic Stommel models have the further potential of explaining the features of the global temperature-salinity distribution in the oceans. We propose several such models, of varying complexity, which provide the blueprints to understand both empirical data and general circulation models.

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