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Resolution-induced emergence of intrinsic low-frequency variability in the global ocean: AMOC, SST, SSH.

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Future ocean-atmosphere coupled models used for climate studies and projections will include eddying rather than laminar oceans. Based on seasonally- and interannually-forced global ocean/sea—ice simulations, this study shows that increasing resolution from 2° to 1/4° and to 1/12° leads to the emergence of a strong, intermittent, intrinsic (nonlinearly-driven), low-frequency (interannual-to-multidecadal) oceanic variability. We discuss the link between this low-frequency intrinsic variability and the chaotic character of the ocean circulation in the interannually-forced eddying regime. We will particularly focus on the Atlantic Meridional Overturning Circulation, Sea-Surface Height and Temperature, whose variability is being monitored, and whose direct forcing by the atmosphere is partly questioned by our results. The chaotic character of the intrinsic AMOC and SST low-frequency variabilities may, in turn, impact the atmosphere and the climate in future coupled simulations.