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Ocean circulation recovery makes global-warming induced deoxygenation a transient phenomenon

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Current anthropogenic warming is responsible for ongoing ocean deoxygenation. Numerical models indicate that only about a quarter of oxygen loss caused by historical anthropogenic greenhouse gas emissions has been realized, with three quarters still to come even if all emissions were stopped immediately. Interestingly, model simulations also indicate that a future warmer ocean may, on a multi-millennial timescale, eventually contain even more dissolved oxygen than the pre-industrial ocean. While an eventual recovery of the meridional overturning circulation stimulates enhanced ventilation of the ocean interior and thereby also leads to a recovery of ocean oxygen, vigorous re-oxygenation occurs via Southern Ocean deep convection events that, in many model configurations, end the temporary enhancement in ocean stratification during global warming. An analysis of different model results will be presented, addressing the hypothesis that deep ocean oxygen depletion driven by global warming can only be a transient event unless large amounts of nutrients are added to the ocean at the time of global warming.