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Ocean Circulation and its Role in Global Warming

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The surface of the planet is warming because of increased greenhouse gases in the atmosphere. To predict the rate of increase we need to understand how much heat and carbon dioxide are taken up by the ocean. This in turn requires an understanding of both turbulent processes in the upper ocean and the deep, quasi-laminar, overturning circulation. The timescale for the ocean to fully equilibrate to increased greenhouse gases is likely much longer than the timescale on which fossil fuels will still be readily available, and this has important ramifications for what we mean by climate sensitivity. I will discuss these issues with an emphasis on the physical processes of the ocean.