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AMOC thresholds in CMIP6 models: NAHosMIP

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The Atlantic meridional overturning circulation (AMOC) is an important part of our climate system, which keeps the North Atlantic relatively warm. It is predicted to weaken under climate change. The AMOC may have a threshold beyond which recovery is difficult, hence showing quasi-irreversibility (hysteresis). Although hysteresis has been seen in simple models, it has been difficult to demonstrate in comprehensive global climate models.

We present results from the North Atlantic hosing model intercomparison project, where we applied an idealised forcing of a freshwater flux over the North Atlantic in 8 CMIP6 models to explore this threshold. The AMOC weakens in all models from the freshening, but once the freshening ceases, the AMOC recovers in some models, and in others it stays in a weakened state. We will discuss mechanisms behind the different behaviour in the different models.