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Observed and simulated daily to seasonal MOC variability at 26N in the Atlantic

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Daily to seasonal variability of observed mass transports along the transatlantic section at 26N is compared to simulations of a coupled global climate model (ECHAM5/MPIOM). The observed mass transports are based on the latest measurements from the RAPID 26N MOC array taken between April 2004 and April 2005. The climate model simulations are part of a suite of experiments performed for the IPCC (Intergovernmental Panel on Climate Change) Assessment Report 4. The experiments use three sets of prescribed aerosol and greenhouse gas concentrations. The simulations where carried out in ensemble mode with different initial conditions in the ocean and atmosphere.

In analogy to the observations the simulated ocean flow is decomposed into three components: wind driven Ekman transport, Florida Strait transport and basin-wide density driven geostrophic transport. The average strength and variability of the simulated transport components show a good correspondence to the observed data. The simulations indicate the existence of a seasonal cycle in all transport components. The observed period is however to short see if such a seasonal cycle is present in the real MOC as well. The ensemble of simulated transports is used to investigate the mechanisms that drive the variability and the potential of predictability of the MOC on these short timescales.