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The influence of Agulhas Leakage dynamics on the Atlantic Meridional Overturning Circulation during glacial-interglacial transitions

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It has been proposed that the influence of the Indian-Atlantic warm water exchange route on the Atlantic Meridional Overturning Circulation has been subject to change in the past. In particular, the dynamics of the Agulhas system are largely determined by meridional shifts in the subtropical front. By incorporating the COSMOS Earth System Model, this research, generated within the EU Marie Curie GATEWAYS project, utilises an ocean grid which locates the model's south pole over South Africa, thereby increasing spatial resolution in the Agulhas region and throughout the Atlantic basin. We are therefore capable of simulating much of the complex dynamics which governs the Agulhas system. In order to analyse Agulhas system dynamics over glacial-interglacial transitions, Last Glacial Maximum (LGM) boundary conditions were applied in accordance with the guidelines established and set out by PMIP3 (Paleoclimate Modelling Intercomparison Project Phase III). Initial results suggest that globally averaged SST's (sea surface temperatures) decreased by approximately 3º C during the LGM , and that the AMOC (Atlantic Meridional Overturning Circulation) was characterised by stronger deep water convection in the North Atlantic and hence a higher maximum stream-function. Sensitivity studies involving the freshwater perturbation, the carbon cycle and solar insolation will next be utilised to investigate the role of the Agulhas system on deglacial millennial scale climate change. In addition, a further simulation of the glacial period during MIS 6 (Marine Isotope Stage 6) will be discussed.