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# Wind Influence on the Glacial Ocean Circulation

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We studied the effect of changes in the wind-stress field on sea-surface and sub-surface water-mass properties (mainly temperature, but, e.g. also nutrient and dissolved oxygen concentrations) at the Last Glacial Maximum, using the University of Victoria Earth-System Climate Model. The changes in the wind stress field were obtained from fully-coupled PMIP2 simulations. We compared our results to other models as well as to glacial reconstructions (e.g. by projects such as GLAMAP - Glacial Atlantic Ocean Mapping and MARGO - Multi-proxy Approach for the Reconstruction of the Glacial Ocean Surface) in terms of an 'objective function' that quantified the misfit as a weighted sum of root-mean square errors. Our questions included: By how much can we improve the fit to the reconstructed sea-surface temperature (SST) by merely changing the wind-driven part of the ocean circulation? What does a glacial SST reconstruction tell us about the thermohaline-driven part of the ocean circulation? Without changes in the wind-stress field the structure of the sea-surface anomalies turned out to be very zonal, i.e. there were almost no differences in the east-west direction. Changes in the wind-stress field brought about a significant change in the spatial anomaly patterns. Furthermore, through various feedbacks (e.g. advection, evaporation, sea-ice), they could cause both, an appreciable strengthening or weakening of the meridional overturning circulation.