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Recent progress in modelling the global ocean/sea-ice circulation at eddy permitting resolution

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With the objective of simulating the changes observed in the ocean circulation in recent decades, and to explain the physical mechanisms responsible for these changes, the Drakkar project has developed a hierarchy of ocean/sea-ice model configurations, from global eddy permitting (1/4˚) to North Atlantic eddy resolving (1/12˚). For an improved representation of ocean-atmophere exchanges it is important that ocean models represent correctly the position of the major fronts. Series of sensitivity tests have been performed with the Dakkar model configurations to carefully evaluate the impact on model solutions of the recent state-of-the-art parameterisations and numerical schemes. We have found significant improvements of the ocean circulation in some cases. The results point out the influence of the momentum advection scheme, of the partial step representation of the bottom topography, of the sub-gridscale parameterisation at eddy permitting resolution, and enlighten the need of improved side-wall and bottom boundary layer parameterisations. The influence of different freshwater flux specifications is also considered.