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Challenges raised by global ocean configurations in the context of climate modelling

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The tuning phase of IPSL-CM6A-LR, a climate model of CMIP6 using NEMO as ocean component, lasted for 4 years, during which we explored different numerical recipes controlling ocean vertical mixing, among others. Analysis of all simulations is still ongoing, but two lessons can be learned so far. [1] After more than 2,000 yr of integration (using pre-industrial external forcings), the deep ocean has not reached an equilibrium, yet. [2] Sensitivity experiments exploring structural and parametric uncertainties indicate that some intrinsic climatic features of this model are quite robust. Overall, this suggests that we currently have little control on the backbone of numerical oceans.