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Energy transport in a “cold” (Last Glacial Maximum) and a “warm” (4xCO2) climate

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Climate dynamics is in most part driven by the difference in the radiative balance between low and high latitudes. The Tropics receive more radiative energy from the sun than what is emitted back to space, whereas the contrary occurs in the high latitudes, where energy is lost through radiative processes. Oceanic currents and atmospheric movements contribute to transferring the excess energy from the Tropics to the poles. This transfer of energy takes different forms depending on the dynamical process involved (mean meridional circulation, stationary wave or transient eddies for the atmosphere) and depending on the form under which the energy is stored (latent, sensible, potential or kinetic, in the air).

In this study, we analyse how this transfer of energy takes place in different ocean-atmosphere general circulation models (**OAGCMs**) simulating different climatic contexts: the climate during the Last Glacial Maximum (**LGM**) and the climate that would exist under CO2 concentrations reaching four times the preindustrial values (**4xCO2**). Models participating to the second phase of the Paleoclimate Modelling Intercomparison Project (**PMIP2**) are used to study the climate of the LGM. For the 4xCO2 simulations, two of the models participating to the 4^{th} Intergovernmental Panel on Climate Change (**IPCC**) are used. The changes in the transport of energy between both climates and the preindustrial one are considered, enlightening the symmetrical and the non-symmetrical behaviours between this “cold” and this “warm” climate.