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Present and past climate as a state of maximum entropy production

Corentin Herbert and Didier Paillard

Laboratoire des Sciences du Climat et de l'Environnement, CEA-CNRS-UVSQ, Institut Pierre Simon Laplace, Gif-sur-Yvette, France

Earth climate is represented as a steady state in a simple atmosphere box model with no explicit time dependence. The part traditionnally played by atmospheric dynamics is here filled by a global thermodynamic constraint : assuming energy balance, radiative fluxes are calculated explicitly while convective and advective heat fluxes are adjusted to satisfy a maximum entropy production condition. Such models have already been considered in the past. Present work extends the maximum entropy principle to vertical convective fluxes, provides a physical derivation of radiative coefficients that were previously introduced as *ad hoc* parameters and sets a formal framework for future generalizations and experiments. This model uses no *a priori* parametrization : radiative fluxes are treated in a sleek new fashion, *Net Exchange Formulation*, which allows for computation of optical depths at an arbitrary accuracy, and the remaining degrees of freedom are infered from entropy maximization.

Zonal mean temperatures predicted for present climate lie in a satisfactory range, while the shape of energy transfers fits observations qualitatively. Applications to past climates are also considered, with a specific emphasis on the Last Glacial Maximum : the MEP results for the LGM are compared to more conventional data from intermediate complexity models or GCMs.