



Middle Miocene climate and vegetation model reconstructions and their validation with the NECLIME database

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The NECLIME database gathers data of the fossil flora recorded at many localities around the world at different times of the Miocene. François et al. (Palaeogeography, Palaeoclimatology, Palaeoecology, 304, 359–378, 2011) have presented a new method for evaluating palaeoclimate model simulations from such fossil floras. In this method, palaeovegetation is simulated from climate model outputs, using a dynamic vegetation model. Model vegetation reconstruction is then compared to the vegetation cover indicated by the fossil flora record at the various localities, using a common classification of plant functional types (PFTs) in the data and the model.

Here, we apply this method to test several published Middle Miocene climate simulations conducted with General Circulation Models of different complexity: (a) Planet Simulator, (b) FOAM-LMDZ4, (c) MPI-ESM, (d) CCSM3.0 and (4) CESM1.0. Corresponding palaeovegetation distributions are simulated with the CARAIB dynamic vegetation model, in which an upgraded vegetation classification involving 26 PFTs has been implemented. The NECLIME palaeoflora data from 154 localities distributed worldwide have been translated in terms of the presence/absence of these PFTs. A comparison of models and data is then undertaken globally and in selected regions of the world, using all available localities. The level of agreement varies among models, among PFTs and among regions. For instance, some models are able to produce tropical and subtropical PFTs in Europe consistently with the data, but the agreement for these PFTs may be much poorer in other parts of the world, such as in northeastern Eurasia.