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Could the Pliocene constrain the Equilibrium Climate Sensitivity?

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Modelling paleoclimates with the same models that are used for future projections allows us to elucidate any links between past and future climate changes. If data from the past are sufficient it may then be possible to use this link to inform on the quality of future projections. The mid-Pliocene Warm Period is the most recent interval in which atmospheric carbon dioxide was substantially higher than in modern pre-industrial times. It is, therefore, a potentially valuable target for testing the ability of climate models to simulate climates warmer than the pre-industrial state. The recent Pliocene model inter-comparison Project (PlioMIP) presented boundary conditions for the mPWP, and a protocol for climate model experiments. Here we analyse results from the PlioMIP and, for the first time, discuss the potential for this interval to usefully constrain the equilibrium climate sensitivity. We present an estimate of 1.8-3.6 C, but there are considerable uncertainties surrounding the analysis. We consider the extent to which these uncertainties may be lessened in the next few years.