



Modelling Phanerozoic Climate Change (Milutin Milankovic Medal Lecture)

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Palaeoclimate Modelling is a powerful tool for helping to understand the processes and mechanisms involved in climate change, as well as testing the climate models used to predict future change. Traditionally, such work has had to focus on a few specific time periods (such as the Holocene, LGM, or early Eocene). However, with the advent of increased computer power and faster models, it is now possible to use models to examine the transient behaviour of the climate system in the past. The talk will review modelling work of the last glacial-interglacial cycle, examining the relative role of orbital forcing, greenhouse gases, and feedbacks from ice sheets. The talk will then present new work examining the variability of climate over the last 400 million years. The results show that the changes of palaeogeographies can have major impact on climate at continental scales but that on global scales the changes in palaeogeography are much less important. Global temperatures are primarily controlled by the long term change in solar constant, greenhouse gases, and feedbacks from the ice sheets. The work also shows that the modelled climate is consistent with the longer-term transitions from icehouse to greenhouse worlds. The large regional variability of modelled climate suggests that the palaeodata estimates of past global mean temperatures should be treated with some caution.