Modelling climate change: the role of unresolved processes

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Our understanding of the climate system has been revolutionized recently, by the development of sophisticated computer models. The predictions of such models are used to formulate international protocols, intended to mitigate the severity of global warming and its impacts. Yet these models are not perfect representations of reality, because they remove from explicit consideration many physical processes which are known to be key aspects of the climate system, but which are too small or fast to be modelled.

The purpose of this review paper is to give a personal perspective of the current state of knowledge regarding the problem of unresolved scales in climate models. A recent novel solution to the problem will be discussed, in which it is proposed, somewhat counter-intuitively, that the performance of models may be improved by adding random noise to represent the unresolved processes.