Spatial Energy Balance Climate Models and the Economics of Climate Change

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Abstract:

This paper presents the first, to our knowledge, coupled spatial energy balance climate model integrated with an economic growth model. It introduces solution methods for spatial climate models that may be new to economics and integrates these methods with the standard methods of solving economic models.

The coupling of dynamic economic growth models with dynamic spatial Energy Balance Climate Models (EBCMs) that we undertake in this paper enables us to obtain new insights into the intertemporal shape and the spatial shape of the distribution function of damages and to translate these insights into policy rules regarding the temporal and spatial paths of mitigation efforts.

The coupling of a simplified version of the energy balance model with a simple economic model and the explicit introduction of ice line damages, through the EBCMs, suggest even at this very simple level, the possibility of multiple steady states, and history dependence on the optimal paths, and non monotonic policy functions.