NEW COUPLED CLIMATE–SOCIO-ECONOMIC MODEL WITH DYNAMIC TWO-ACTOR ECONOMIC GROWTH MODULE

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We present a new socio-economic module incorporated in the coupled climate-socio-economic model SIAM to study optimal strategies for climate change mitigation. The climate and the socio-economic module are coupled via anthropogenic GHG emissions and surface temperature change, a proxy variable to parameterize damages to the economic system. The climate module of SIAM is a nonlinear extension of a linearized impulse-response model calibrated against an OA-GCM and a 3-D carbon cycle model.
The economic module consists of a globally aggregated growth model with two actors: a global entrepreneur and government. Both attempt to maximize their specific intertemporal welfare. Government maximizes total consumption at minimal costs of climate damages and social inequality (unemployment). This is achieved by imposing taxes on GHG emissions and unemployment, while the entrepreneur seeks to maximize shareholder's earnings within the given taxation framework. Other features of the model are limited fossil fuel resources and endogenous development of technological and fuel efficiency.