

The Uncertainty due to Spatial Scale of Climate Scenarios in Integrated Assessments: An Example from U. S. Agriculture

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The appropriate level of spatial resolution for climate scenarios is a key uncertainty in climate impacts and regional integrated assessments. Here we investigate consequences of varying climate scenario resolution in the context of an integrated assessment of agriculture in the United States. Climate scenarios were developed using both a coarse scale general circulation model and a spatially more refined regional climate model, nested within the coarse model. Simulated changes in crop yields were constructed under both the coarse and fine scale scenarios. The results demonstrate that the spatial scale of climate scenarios affects the estimates of both regional changes in crop yields and the economic impact on the agricultural sector as a whole. National economic welfare increased substantially under the coarse scale climate scenario, but increased much less under the fine scale. Regional indicators of economic activity were of opposite sign in some regions, based on the scenario scale.

Such differences in economic magnitudes or signs become important in public policy debates concerning climate change. Hence refinement of spatial scale of scenarios should be carefully considered in future impacts research.

Thursday III (Keynote talk)