ISNET 2020

Wednesday December 16
Webinar ID 94271308587
(Password is required)

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"Combining interdependent climate model outputs: A spatial Bayesian approach"

Climate models are the basis of reports of the Intergovernmental Panel on Climate Change. The multi-model ensemble approach utilizes multiple climate model outputs rather than one to obtain more accurate results. However, combining different climate model outputs is challenging. The traditional multi-model mean approach that simply takes the average of all the available outputs ignores the dependence among climate models that can be due to various reasons. New methods that attempt to handle this problem by proposing a weighted average or introducing new paradigms allow for less restrictive assumptions for climate model errors. We extend recent work by Sansom et al. (2017) that took different sources of bias and uncertainties into account but neglected spatial and inter-model dependence. We propose an unprecedented model paradigm that considers all the necessary components, such as spatial and inter-model dependence, the emergent relationship between historical and future periods in climate models, and errors from different sources. Extensive simulations show our model provides better estimates for future climate and more precise uncertainty quantification. Two real-data examples using CMIP5 data are given to show how the proposed model can be used to analyze climate model outputs in practice.