



Uncertainties in Simulated ENSO Arising from Internal Climate Variability

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Significant uncertainties exist in El Niño–Southern Oscillation (ENSO) simulations. To investigate the source of these uncertainties, previous studies have primarily focused on the model itself; however, internal climate variability (ICV) as a source of uncertainty has not been sufficiently explored to date. Using the Community Earth System Model–Last Millennium Ensemble (CESM–LME) modeling project and the Coupled Model Intercomparison Project (CMIP), an investigation into uncertainties in simulated ENSO arising from ICV is performed. Results show that external forcing can significantly increase the uncertainties arising from ICV when the simulation length is greater than ~ 40 years. In addition, the spread in ENSO amplitude arising from ICV accounts for 50% of the total spread within the CMIP5 historical simulations. Finally, the impact of ICV on ENSO varies considerably with simulation length and stabilizes at the threshold of 300–400 years.