

4.5 REGIONAL CLIMATE SIMULATION OF THE ANOMALOUS EVENTS OF 1998 USING A STRETCHED-GRID GCM WITH MULTIPLE AREAS OF INTEREST

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1. INTRODUCTION

The GEOS (Goddard Earth Observing System) stretched-grid (SG) GCM developed and thoroughly tested over the last few years, is used for simulating the major anomalous regional climate events of 1998. The anomalous regional climate events are simulated simultaneously during the 13 months long (November-1997 - December-1998) SG-GCM simulation due to using the new SG-design with multiple (four) areas of interest. The following areas/regions of interest (one at each global quadrant) are implemented: U.S./Northern Mexico, the El-Nino/Brazil area, India-China, and Eastern Indian Ocean/Australia.

2. REGIONAL SIMULATION RESULTS

The simulated anomalous regional climate events include: the April-June flooding in the Midwest and Northeast and drought in the South of the U.S.; the December-1997 - May-1998 Mexican drought; the Indian summer monsoon; the severe summer flooding in China; and anomalous precipitation over Australia. The simulations of the anomalous regional climate events are validated against the GEOS SG-DAS (Data Assimilation System) assimilated products. The SG-DAS was developed by the authors for producing enhanced resolution regional analyses and diagnostics. Regional resolution for both SG-GCM and SG-DAS versions used in the study is 50 km. The independent high resolution gauge data are used for validating the simulated regional precipitation anomalies.

The limited ensemble integrations for summer of 1998 are performed and their results are assessed.

The regional climate simulations captured successfully the above major anomalies at medium and mesoscale resolution. The high quality of global circulation and consistent interactions between global and regional scales are maintained for the SG-GCM integration with multiple areas of interest.

The obtained results show that the SG-GCM with multiple areas of interest is a viable tool/candidate for annual high resolution/mesoscale simulations of different anomalous regional climate events.

References

Fox-Rabinovitz, M.S., L.L. Takacs, and R.C. Govindaraju, 2001: A variable-resolution GCM and DAS with multiple areas of interest: Studying the anomalous regional climate events of 1998, to be submitted.

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