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The Climatologically relevant singular vector and its application in climate predictions

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In this talk, an efficient technique for the extraction of climatically relevant singular vectors (CSV) in the presence of weather noise is introduced. Emphasis is placed on the applications of the CSV in seasonal climate predictions. First, the CSV method is validated by an intermediate ENSO model. The results show that the algorithm is an effective and robust method for the calculation of the climatically relevant singular vectors of CGCM. Then, this algorithm is applied to several important high-impact events of air-sea interaction to study their seasonal climate predictability using CGCMs, including ENSO, South Asian Monsoon, and the seasonal climate anomalies over China. The CSV-based ensemble technique is developed and evaluated for these CGCMs. The results indicates that the CSVs can well characterize the optimal error growth of the predictions of these events, and all CSV-based ensemble predictions have better skill than traditional time lag ensembles (TLE). This suggests that the CSV method be effective and significant in improving the seasonal climate prediction, and should be used in operational ensemble climate predictions.