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# Growth of errors of Nino 3.4 forecasts in a coupled GCM

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The growth of errors of Nino 3.4 forecasts based on a coupled global circulation model is analyzed as an approach to assess the impact of ensemble initialization schemes on seasonal predictions. The error growth is partitioned into errors associated with initial conditions (internal) and the errors attributed to model deficiencies (external). The study uses 23 years of available retrospective monthly ensemble forecasts from the NCEP Climate Forecast System (CFS), generated using a "lagged" scheme. Because of the complexity of the system compared with the length of the retrospective forecast data available, the study is limited to forecast errors after systematic errors are removed. Once the forecast errors are parameterized, the focus is on the tendency of the ensemble mean forecast error under two particular scenarios. In one scenario, the external error is set to zero (perfect model situation) and the initial errors arising from lagged forecasts are kept. In the second scenario, the external error is kept while the initial errors associated with lagged forecasts are remove -equivalent to running all ensemble members simultaneously. The results indicate that forecast errors are primarily influenced by the initial errors in the first 6 weeks of lead and remain constant through the leads; beyond this period, forecast errors are dominated by external errors. The results suggest a synergistic skill improvement if both internal and external errors are reduced.