CGD SEMINAR

DATE: Tuesday, 3 April 2018

TIME: 11 a.m.

LOCATION: NCAR, 1850 Table Mesa Drive
Mesa Lab, Main Seminar Room

TITLE: Initialized climate forecasts without initialization

SPEAKER: Matt Newman, NOAA

ABSTRACT:

Seasonal forecasts made by coupled general circulation models (CGCMs) undergo strong climate drift and initialization shock, driving the model state away from its long-term attractor. Here we explore initializing directly on a model's own attractor, using an analog approach in which model states close to the observed initial state are drawn from a "library" obtained from prior uninitialized CGCM simulations. The subsequent evolution of those "model-analogs" yields an ensemble forecast, without additional model integration. This technique is applied to four of the eight CGCMs comprising the multi-model ensemble used operationally by NCEP, by selecting from prior long control runs those model states whose monthly tropical IndoPacific SST and SSH anomalies best resemble the observations at initialization time. Hindcasts are then made for leads of 1-24 months during 1982-2009. Deterministic and probabilistic skill measures of these model-analog hindcasts are comparable to, and in the ENSO region better than, the initialized CGCM hindcasts, for both the individual models and the multi-model ensemble. Despite initializing with a relatively large ensemble spread, model-analogs also reproduce each CGCM's perfect-model skill, consistent with a coarse-grained view of tropical Indo-Pacific predictability. This study suggests that with little additional effort, sufficiently realistic and long CGCM simulations may offer skillful seasonal to interannual forecasts of tropical IndoPacific SST anomalies, even without sophisticated data assimilation or additional ensemble forecast integrations. The model-analog method could provide a baseline for forecast skill when developing future models and forecast systems.

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