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Title: Forecast skill sensitivity to variations in state vector data quantity and quality for a physical space based linear inverse model.

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Abstract:

Previous studies demonstrate that the MJO can be predicted skillfully to 15-20 days, numerically or by various statistical methods such as lagged linear regression and linear inverse modeling (LIM) (Newman et al. 2009). Newman et al. used LIM to forecast the MJO by predicting EOFs of a multivariate dataset in lat-lon space. Our LIM uses physical space (longitude) bins, so it is easier to visualize and may produce comparable prediction skill of the MJO. Forecast skill of a global sum of squared OLR errors is compared between a LIM constructed with univariate (OLR only) and multivariate state vectors to understand model sensitivity to the amount (few versus many) and quality (pure versus randomized or scrambled) of state vector input data. Hindcast skill is assessed by comparing the forecast error to the global climatological variance, which is the skill of a forecast of zero anomaly every day (climatology used as a forecast).

Two case studies highlight our LIM in forecasting OLR associated with an MJO at different longitudes and in forecasting u200 during the mid-summer drought within the Intra-Americas Sea.

Newman, Matthew, Prashant D. Sardeshmukh, and Cécile Penland. 2009. How Important Is Air-Sea Coupling in ENSO and MJO Evolution? Journal of Climate 22 (11) (June): 2958-2977. doi:10.1175/2008JCLI2659.1.

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