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 Indo-Pacific 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 Indo-Pacific 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.