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The impact of a new simple SST slab model on a monthly forecasting system.

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Atmospheric monthly forecast is intermediate between medium range forecast, an initial value problem, and seasonal forecast, a boundary value problem. The influence of sea surface temperature (SST) on the atmospheric dynamics in the time range of 10-40 days is still not well understood. As a consequence, there is no common approach for the representation of the SST in a monthly prediction system. At ISAC-CNR in Bologna a monthly ensemble forecasting system is run experimentally once a month, based on the GLOBO model. GLOBO is an atmospheric general circulation model developed at ISAC. The evolution of SST is represented by a simple slab ocean model based on surface flux balance with a relaxation term to climatological SST. Recently, a new definition of the slab ocean model which includes a flux correction term has been implemented to improve the SST simulation. It has been tested in parallel with the operational forecast for some months of 2011. The results show that the globally averaged root mean square forecast error of the SST simulated with the new model is slightly larger than the operational one. However, the ensemble spread of the SST predicted with the new model increases significantly and becomes very similar to the observed SST variability, in particular in the Northern Hemisphere. The atmospheric field differences between the new and operational forecasts show that SST has an impact in the second part of the month, especially in the Southern Hemisphere. The ensemble spread of atmospheric parameters shows a slight increase using the new slab model. However, its impact on the anomaly forecast fields is small.