



GOFS16: a Global Ocean Forecast System at eddying resolution

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GOFS16 is the CMCC short-term predictions operational ocean forecasting system. Its horizontal resolution of 6.9km ($1/16^\circ$) at the equator (~ 2 km at high latitudes) with 98 unevenly-spaced vertical levels, makes it one of the few mesoscale resolving operational systems in the world.

GOFS16 is based on an eddying global NEMO-LIM configuration (Iovino et al. 2016), and is coupled to a 3DVAR data assimilation methodology (Storto et al. 2015) to provide daily initialization fields. The system assimilates salinity and temperature profiles, sea surface temperature, along track sea surface height, and sea-ice concentration on a daily basis. The forecast system is forced with 3-hourly momentum, radiation, precipitation fluxes from the operational Global Forecast System (GFS) fields, and it runs once a day to produce a 6-day forecast. Results include global sea surface height and three-dimensional temperature, salinity, velocity fields, and sea-ice properties. An overview of the system is presented. Assessment of predictive skills is carried out with all the available observations.

This forecast system is also used for several downstream applications, namely regional and coastal downscaling in several regions of the world ocean. Downscaling in several regional and coastal areas is realized with a new tool, the Structured and Unstructured Relocatable ocean model for Forecasting (SURF, Trotta et al. 2016) based on NEMO, reaching resolutions of $1/64^\circ$ and nested within the global operational model.

Iovino, D., Masina, S., Storto, A., Cipollone, A., and Stepanov, V. N.: A $1/16^\circ$ eddying simulation of the global NEMO sea-ice–ocean system, *Geosci. Model Dev.*, 9, 2665-2684, 2016.

Storto, A., Masina, S., Navarra, A.: Evaluation of the CMCC eddy-permitting global ocean physical re-analysis system (C-GLORS, 1982-2012) and its assimilation components, *Q. J. R. Meteorolog. Soc.*, 142 (695), 738-758, 2015.

Trotta, F., Fenu, E., Pinardi, N., Bruciaferri, D., Giacomelli, L., Federico, I., Coppini, G. A Structured and Unstructured grid Relocatable ocean platform for Forecasting (SURF), *Deep-Sea Res. II*, 133, 54-75, 2016.