A large-scale view of oceanic variability from 2007 to 2015 in the global high resolution monitoring and forecasting system at Mercator Océan

Florent Gasparin, Eric Greiner, Jean-Michel Lellouche, Olivier Legalloudec, Gilles Garric, Yann Drillet, Romain Bourdallé-Badie, Pierre-Yves Le Traon, Elisabeth Rémy, Marie Drévillon

PII: S0924-7963(18)30011-3
DOI: doi:10.1016/j.jmarsys.2018.06.015
Reference: MARSYS 3101

To appear in: *Journal of Marine Systems*

Received date: 17 January 2018
Revised date: 25 June 2018
Accepted date: 26 June 2018

Please cite this article as: Florent Gasparin, Eric Greiner, Jean-Michel Lellouche, Olivier Legalloudec, Gilles Garric, Yann Drillet, Romain Bourdallé-Badie, Pierre-Yves Le Traon, Elisabeth Rémy, Marie Drévillon , A large-scale view of oceanic variability from 2007 to 2015 in the global high resolution monitoring and forecasting system at Mercator Océan. Marsys (2018), doi:10.1016/j.jmarsys.2018.06.015

A large-scale view of oceanic variability from 2007 to 2015 in the global high resolution monitoring and forecasting system at Mercator Océan

Florent Gasparin[a,*], Eric Greiner[b], Jean-Michel Lellouche[a], Olivier Legalloudec[a], Gilles Garric[a], Yann Drillet[a], Romain Bourdallé-Badie[a], Pierre-Yves Le Traon[a,c], Elisabeth Rémy[a], Marie Drévillon[a]

[a] *Mercator-Ocean International, 10 Rue Hermès, 31520 Ramonville-Saint-Agne, France*
[b] *CLS, 11 Rue Hermès, 31520, Ramonville-St-Agne, France*
[c] *Ifremer, 29280, Plouzané, France*

Abstract

The global high resolution monitoring and forecasting system PSY4 at Mercator Océan, initialized in October 2006, has achieved 11 years of global ocean state estimation. Based on the NEMO global 1/12° configuration, PSY4 includes data assimilation of satellite and multi-instrument *in situ* observations. In parallel to this monitoring system, a twin-free simulation (with no assimilation) has been performed for the period 2007-2015. In this study, monthly-averaged fields of both ocean state estimates are compared with observation products for the period 2007-2015, to examine the consistency of PSY4 fields with related observations for representing large-scale variability and to provide a baseline that is mainly focused on *in situ* comparisons for validation/qualification of on-going system developments. Observations play a major role in correctly positioning the main energetic structures, both in space and time. In addition, data assimilation appears to overcome the other deficiencies of models by reducing SST bias in upwelling regions and by increasing the thermocline gradient in the tropics. Generally, the amplitude of the total-resolved variability in both PSY4 estimates is consistent with observation data sets. Annual cycle and longer-term variability in temperature, salinity and sea surface height are significantly improved

*Corresponding author
Email address: fgasparin@mercator-ocean.fr (Florent Gasparin)