



A first overview of the 53 year past hydrodynamical variability in the Bay of Biscay from a regional simulation

Guillaume Charria (1), Frédéric Vandermeirsch (1), Sébastien Theetten (1), Charefeddine Assassi (1), and Raphaël Dussin (2)

(1) IFREMER ; DYNECO/PHYSED, Technopôle de Brest-Iroise, BP 70, F-29280 Plouzané, France (guillaume.charria@ifremer.fr), (2) IMCS, Rutgers, The State University of New Jersey, New Brunswick 08901 NJ, USA

In the eastern part of the North Atlantic Ocean, the Bay of Biscay (41°N-52.5°N / 15°W-4°E) is a key region for coastal activities. Crossing open ocean features and continental shelf tidally-forced circulation, the studied region is potentially sensitive to the climate change under the influence of anthropogenic pressures. In this context, the present project aims to investigate the interannual variability (for the circulation and thermal/haline contents), the slope and shelf current systems, the (sub)mesoscale and the sea level dynamics at multi-decadal scales.

Based on a regional hydrodynamical model (MARS3D), we performed a 53 years numerical experiment (period 1958-2010, 4 km spatial resolution).

In terms of hydrological content, daily results show a broad agreement between temperature/salinity decadal trends and climatology (regional climatology BOBYCLIM). Obtained evolutions have also been compared with the global DRAKKAR simulation (GRD100 configuration, 0.25° spatial resolution). Following this comparison, we can note that the dynamics at regional scale improves our estimation of decadal trends. Further interannual metrics (in temperature and salinity) have been computed to evaluate the improvements related to a high resolution solving of the shelf and regional dynamics.

The bathymetry of the Bay of Biscay, including a wide continental shelf, induces different current regimes (i.e. wind driven, tidal, density driven and slope currents). In this framework, we analyse the interannual occurrence of the autumn current over the Armorican shelf as one of the main features of the shelf circulation. This poleward current has been observed using drifters in 2002 and its strong interannual variability has been highlighted. Based on our simulation and after validating this current, it has been described and analysed during the whole period.

Beyond these two major hydrodynamical concerns, this numerical experiment is a first step in the analysis of the interannual variability in the Bay of Biscay. Following exploration will target, for example increasing the spatial resolution, to understand this variability and the associated processes.