

C-CORE 1.3 Historic records for surface currents

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Challenge

Challenge ID	C-CORE_OFF1.3
Title	Historic records for surface currents
Challenge originator:	
General Description	
What data/products do you use?	Historical ocean surface currents data are available via different agencies. They are either based on reanalysis, hindcast model data or derived from satellite observations. Data from Global models: HYCOM+NCODA model system Three Global reanalysis from MERCATOR, University of Reading and CMCC via MyOcean Data from regional models: Mediterranean Sea: MEDSEA (MyOcean) Iberian, Biscay and Irish Seas: IBI MFC model, limited in time European NW Shelf Currents derived from satellite: Global geostrophic currents analysis from MyOcean derived from satellite observations: Global geostrophic currents from NOAA: derived from sea surface height, wind speed and sea surface temperature satellite observations
When do you use this kind of dataset?	Historical ocean surface current data are used to great extent in all phases throughout the O&G cycle, except strictly operational tasks. The data set is used to assist in qualifying and quantifying the means and extremes of ocean currents in the area of interest. In addition ocean data are important for environmental impact studies, oil spill trajectory modeling, modeling of drilling cuttings etc. During the early stages, field assessment/seismics etc. the data are mostly used to assess the operability of the area during different seasons and to assess financial risk and first draft of development costs. During planning of new fields and operations data are used to assess the climatic limitations local/regional weather would have on safety in order to reduce risk for operations, personnel and environment. Finally surface current data are important to design of structures that can withstand the local conditions and take into account the risk of the extreme situations of the area.

What are your actual limitations and do you have a work around?	Same as for wind and wave, only that data of sufficient quality is rare. Most of this is due to the limited access to observations, and if accessible available update frequency, quality and resolution is normally poor. Little data is available to sufficiently ground truth EO data. In addition data of sufficient quality can be hard to come by in coastal and remote/less developed areas. Modelled data has low quality for on shorter time scales, while climatology is of sufficient quality. These data rarely catch short lived and small scale extremes. There are important spatial and temporal limitations of historical surface-based and remotely-sensed ocean current observations that make the analyses of extreme values very challenging (e.g., most extremes at sea were probably not observed or sampled). Update frequency: Generally too slow, and not extended to real-time. And observations for "patching" often not available. Temporal resolution: Not by far sufficient, often daily snapshots, and averages, does not catch important events. Spatial resolution: Not by far sufficient, should have at least 4 km resolution to resolve small scale features and coastal areas. NOTE. High resolution and high update resolution does not equal quality, hence documentation of verification is equally important! !
Needs and expectations on EO data	EO is used for this today, but resolution, update frequency, length of data series and quality is not sufficient for instance design studies. It is used as input in regional reanalysis and hindcast. Long (10 years +) observed time series of high quality (ground-truthed) and with high spatial resolution, especially for coastal areas and emerging O&G areas where demand for such data has been small or non-existent. Or - EO data that can improve modeled reanalyses. Specific need: Long time series of ocean current data.
Challenge classification	
Pre license	3
Exp.	4
Dev.	4
Prod.	3
Decom.	3
Geographic context/ restrictions	Applies to all six areas of interest, except for the cautionary notes about tropical cyclones, which only applies to South China Sea, West of Ireland, and Myanmar. Seasonality: Applies to all seasons.
Topographic classification / Offshore classification	Ocean
Activity impacted /concerned	
Technology Urgency	Short term (2-5 years)
Information requirements	

Update frequency	Daily or weekly, since historical data is frequently required to assess recent events. For some parameters and data sets, monthly is still sufficient. Available today: For the historical reanalyses and archived observations, monthly; however, recent observations are available generally without delay.
Temporal resolution	Data should be at least 1-3 hourly resolution depending on area and phenomena needed to be resolved. Available today: OSCAR: 5-day moving mean. HYCOM+NCODA system: Daily snapshot at 00Z MyOcean global reanalysis: Monthly (all), weekly (MERCATOR) , daily (CMCC) from 1993 Regional models: Mediterranean Sea: MEDSEA (MyOcean): Monthly, daily from 1987 Iberian, Biscay and Irish Seas: IBI MFC model: Daily means (and hourly means) from 20110401 European NW Shelf: FOAM: Daily means from 1985 Currents, temperature and SST derived from satellite: Global geostrophic currents and SST analysis based on satellite observations: Weekly and monthly means
Spatial resolution	Around 4 km, maybe less in coastal areas. Available: OSCAR: 1/3° HYCOM+NCODA system: 1/12° MyOcean global reanalysis: 0.25° Regional models: Mediterranean Sea: MEDSEA (MyOcean) :6-7 km Iberian, Biscay and Irish Seas: IBI MFC model: ~2km European NW Shelf: FOAM: 7 km Currents, temperature and SST derived from satellite: Global geostrophic currents and SST analysis based on satellite observations: 1/4°
Data quality	The selected sources in this document are selected because they are known to have sufficient quality (after some work-around/adaptation). In general separate in-depth verification studies has to be made for each source planned to be used for analysis, and the analysis has to be repeated for each geographical area (since sources might be of sufficient quality in one area but not another). In general, ground observations and modelled sourced are perceived to be of better quality than EO for historical current data.
Data Coverage and extent	Regional
Example format	CSV and/or netCDF
Timeliness	Normally needed urgently, possibly before assessing, planning, or exploring a new field. Hence the data source used for analysis needs to be frequently updated to avoid unnecessary waiting. Daily, weekly or monthly updates of data sets are sufficient, depending on the analysis required.
Existing standards	

Relevant products

Content by label

There is no content with the specified labels