



The KEOPS2 campaign (PI: S. Blain, Observatoire Océanologique de Banyuls sur mer, UPMC) will take place during October-November 2011 around Kerguelen Islands. The aim is to elucidate the response of ecosystem functioning and of the biogeochemical cycles to natural iron fertilization, a key factor controlling ecosystem dynamics (including CO2 export) in the Southern ocean and other basins. It is a multidisciplinary campaign heavily relying on high quality satellite data.

A specific support from CNES will enable KEOPS2 to benefit from such products, both in real time and delayed time production. CNES contributes its skills and knowledge, via Ssalto/DUACS project and in collaboration with LEGOS, to specifically process altimeter products and derivatives for Kerguelen area. A surface colour product is also delivered for the campaign.

A regional Mean Dynamic Topography was specifically processed for Kerguelen area (Fig 1). It benefits from improved processing, the latest geoid model including GOCE data, additional in situ measurements with improved processing.

The regional MDT allows a better restitution of the mean circulation in the area, with for instance, an improved reconstruction of the Fawn Trough Current, or Deep Western Boundary Current loop signature, observed around 80°E, 55°S.

In situ data from KEOPS2 campaign will provide a feedback to improve the regional MDT.

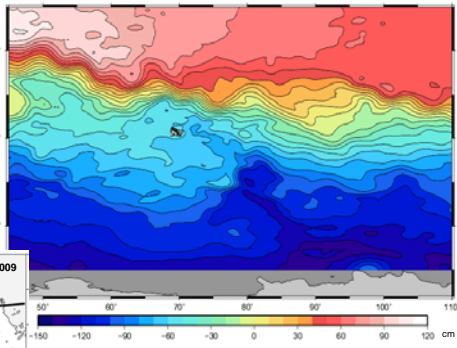
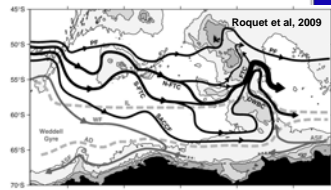


Fig. 1b: Overview of the large-scale circulation in the Kerguelen area as obtained from the present study. The Fawn Trough Current (FTC) results from the combination of mean of the MDT (contour plot) and the velocity field (vector plot) obtained from the altimetry. The FTC is the western boundary current of the MDT. The FTC is a semi-permanent current. The FTC is a semi-permanent current. The FTC is a semi-permanent current. The FTC is a semi-permanent current.



Altimeter data were specifically processed for the construction of Kerguelen regional products. Improvements mainly consist in:

- o Improved noise measurement reduction on along-track data (filtering)
- o New correlation scales estimated in the area (Fig 2).
- o High resolution (14 km for along-track and 1/8° for grids)

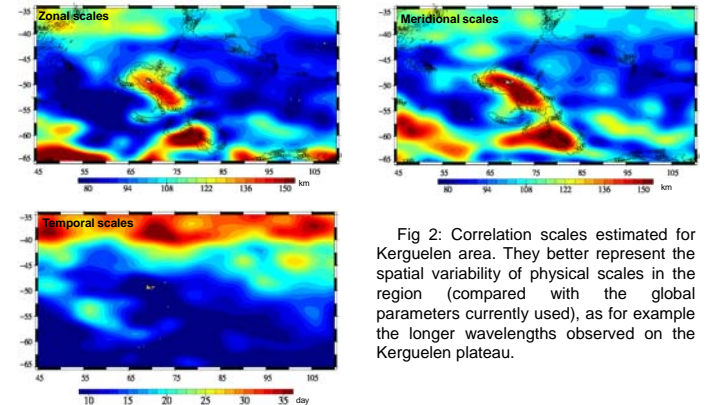


Fig 2: Correlation scales estimated for Kerguelen area. They better represent the spatial variability of physical scales in the region (compared with the global parameters currently used), as for example the longer wavelengths observed on the Kerguelen plateau.

Every day, 21 altimeter products are delivered. They consist in along-track (SLA and ADT) and maps (MSLA and MADT), as well as geostrophic currents (anomalies and absolutes) (Fig 3).

Compared with the Global DUACS product, they allow a better reconstruction of mesoscale structures.

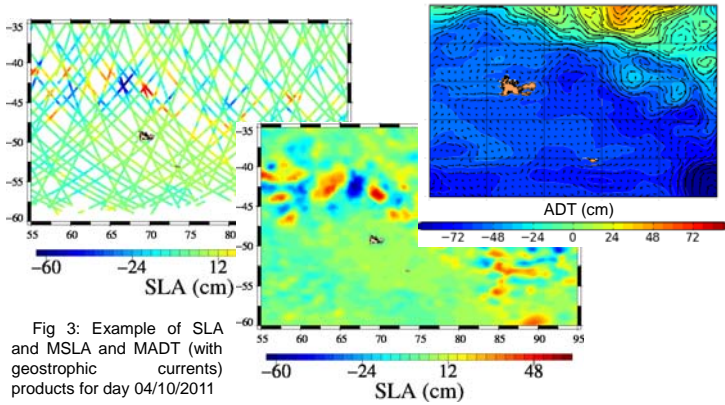


Fig 3: Example of SLA and MSLA and MADT (with geostrophic currents) products for day 04/10/2011

Total surface currents is also delivered (Fig 4). The Ekman component is added to the absolute geostrophic currents (deduced from altimeter product). It is deduced from ECMWF wind stress analysis applying a regional Ekman model, specifically adjusted to the Kerguelen area.

Both, 6-hour Ekman component and daily total surface currents are delivered every day.

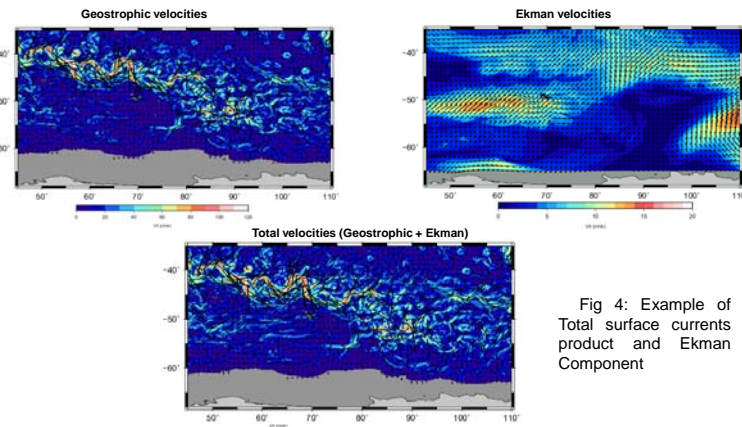


Fig 4: Example of Total surface currents product and Ekman Component

Surface Chlorophyll concentration, merging both MODIS and MERIS measurements, is also delivered (Fig 5).

All these products will be used to better identify the physical structures of interest for the campaign and define the position of in situ measurements. Thanks to a Lagrangian analysis, surface currents are also used to determine the shape of depicted plume. First sensitivity results clearly underlined the quality of regional products (Fig 5)

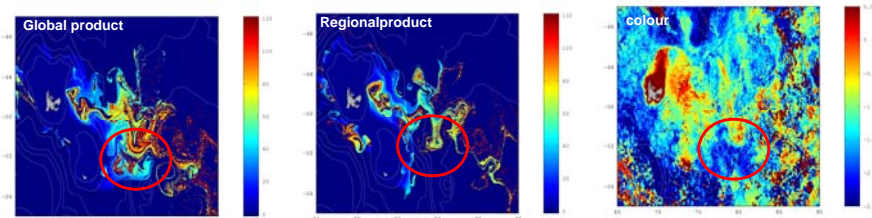


Fig 5: Plume depicted from altimeter surface current applying Lagrangian analysis (global vs regional product) on day 14/09/2011 (left and center) (color is: number of days since a particle has left the plateau), and surface chlorophyll concentration (right).

Altimeter regional products allow us to underline a plume East of Heard Island (see red circle), around 80°E, that extends up to 52°S. It rather extends up to 53.5°S in global product. Surface colour for the same day seems to confirm observation from altimeter regional product.

A small plume is detected south of Kerguelen islands in the regional product, whereas it is not depicted in the global altimeter product. The plume seems to be associated with some biological production, as underlined in surface chlorophyll concentration. The higher accuracy of regional product is used to better define position of in situ measurements to be done during the campaign.

All the products are available via ftp AVISO in the directory /donnees/ftpsedr/DUACS/experimental/regional-kerguelen (granted* access).

Don't hesitate to use them and give your feedbacks to AVISO!

