A Kerguelen regional Sea Level product to support the KEOPS2 experiment

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 derivates 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, 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.

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.

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).

Altimeter regional products allow us to underline a plume East of Heard Island (see red circle), around 80°E, that extents 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/ftp/edr/DUACS/experimental/regional-kerguelen (granted* access).

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