

GEOSTROPHIC CURRENTS PRODUCT

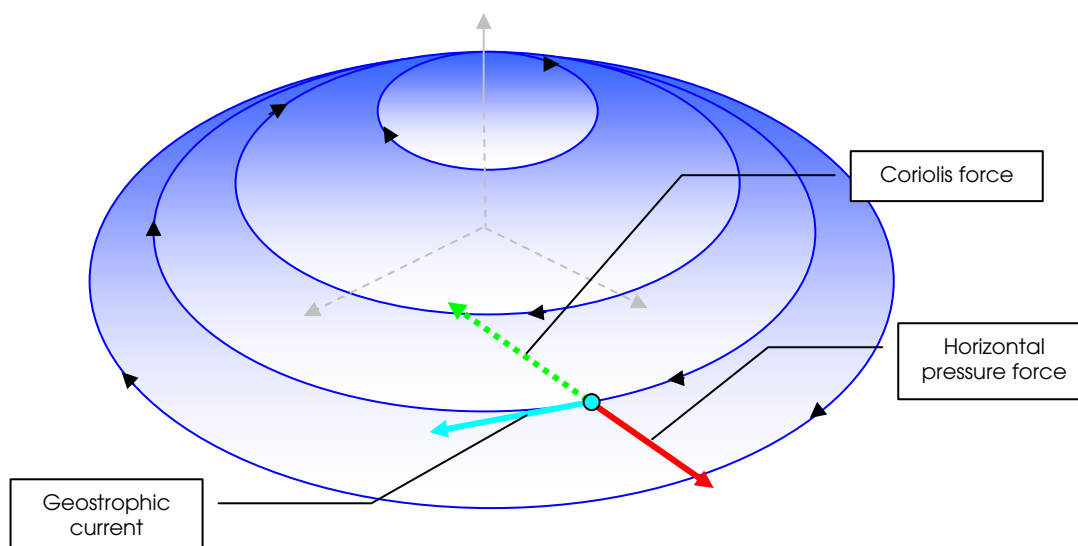
DESCRIPTION

The Space Oceanography Division of CLS developed a near real time -NRT- processing system of satellite altimeter data. These satellite data are combined together to supply maps of Sea Level Anomalies -SLA-. Maps of geostrophic currents are deduced from these maps of SLA. These currents estimate the strength of oceanic eddies and allow to monitor the propagation of eddies and oceanic fronts at the sea surface.

GEOSTROPHIC CURRENTS

Ocean circulation is very complex to study. Ocean currents can raise sea surface over an area. Therefore these currents can be mapped by measuring the height of the peaks and the holes on the ocean surface (they can reach several tens of centimetres).

Generation of geostrophic currents on an oceanic peak in the northern hemisphere

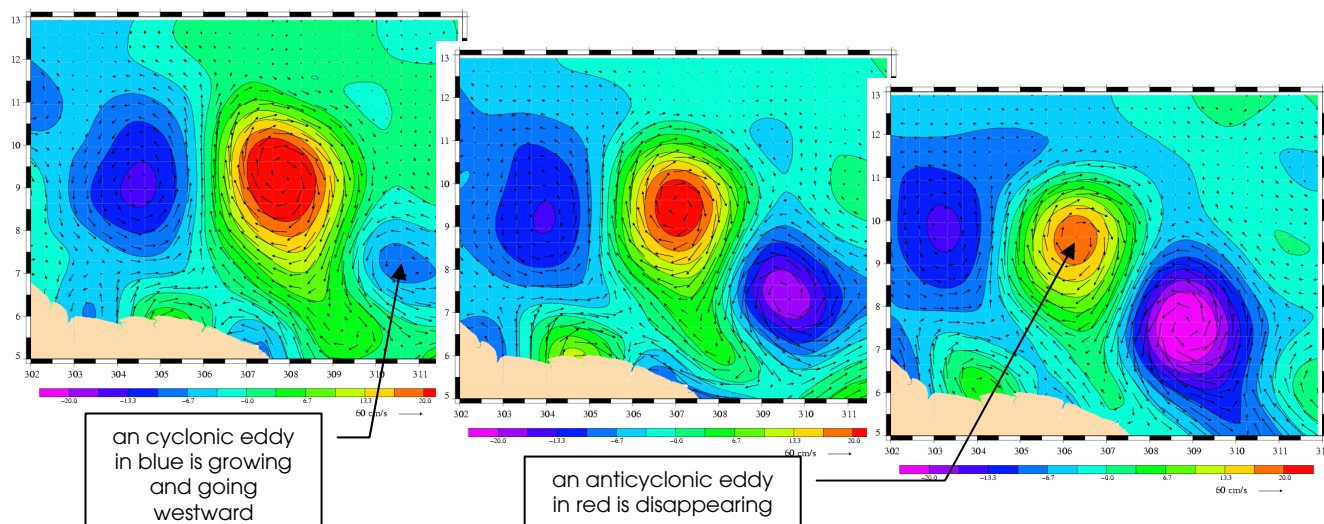


- The Coriolis force is balanced by the gradient of the horizontal pressure force due to the slope of the sea surface: there is a geostrophic equilibrium
- The direction of geostrophic current is always perpendicular to the pressure gradient
- Currents are deduced from the ocean surface topography in the same way as winds are deduced from atmospheric pressure fields
- The Coriolis force vanishes at the equator (no geostrophic equilibrium at the equator): the slopes of the dynamic topography can not be related to geostrophic currents
- By supplying continuous worldwide observations, satellite altimetry provide maps of sea level anomalies from whom currents are deduced except around the equator

PRODUCTS

- Specific algorithm was developed at CLS to deduce the geostrophic currents from the maps of SLA
- Maps of currents allow the user to locate ocean eddies and oceanic fronts
- Maps provide the force and the direction of the oceanic currents
- Computation of the currents give an estimation of the eddies strength propagating over the ocean
- Coverage is global in space and in time since altimetry data are not affected by clouds
- Maps of currents are especially reliable since they give a product of uniform quality all year around
- Over the time the small-scale variations such as eddies can be followed

Set of weekly maps which indicate the propagation of eddies along the Venezuelan coast (Trinidad region)



APPLICATIONS

The global coverage in space and time of the current velocities deduced from radar altimetry is now finding a growing number of scientific and commercial applications. Today, commercial projects have started with:

- the offshore industry (ESA project: EMOFOR)
- the fishing industry (CLS product: CATSAT)

OPERATIONAL MODE

Geostrophic current maps are computed on demand from maps of SLA. They are available on a 1/3° MERCATOR grid but can be re-sampled. Two types of data are available depending on the needed operational mode:

- Hindcast data with Homogeneous Historical products (HH products)
- Nowcast data with Near Real Time products (NRT products).

HH products

- Are available with a two months delay
- Take into account homogeneous and inter-calibrated sea surface height between the different satellites and the best geophysical corrections
- Provide **weekly ocean current maps since October, 14th1992**.
- Supply a **statistical view** of the ocean features

NRT products

- Are delivered as weekly gridded products updated with a **time delay between 48 to 72 hours**
- Give a **synoptic view of the NRT sea level variation** every week
- Supply NRT numerical information of the **current velocities strength**

The CLS current products give a statistical view of the current variability over more than 10 years.

NRT currents are provided to monitor oceanic eddies over the ocean as well the evolution of oceanic fronts.

CONTACT POINTS

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- http://www.cls.fr/html/oceano/welcome_en.html
- <http://www.catsat.com>

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