Resumen

This proposal has three main objectives: (i) to improve our understanding of the circulation on the Patagonian continental shelf (PCS) using satellite altimetry, (ii) to improve our understanding of the dynamics of a major western boundary current, the Malvinas Current (MC) and (iii) to improve our understanding of the interactions between the MC and the circulation on the continental platform. Objectives are motivated by recent studies that indicated that (a) shelf circulation is dominated by a cross-shelf pressure gradient imposed by the MC and (b) evidences of intrusions of the MC into the PCS around 41oS. Given the large variations of MC transport implied by observations, result (a) suggests that similarly large variations may occur over the shelf, while (b) suggests that the MC intrusions may cause the largest non-seasonal temperature and chlorophyll-a variability observed over the shelf.

The scientific objectives are a challenge for Jason altimeter: recent studies revealed multiple fronts on the MC which lead to small spatial scales; both space and time scales are smaller than in the open ocean over continental shelves and close to the coast- the PCS not being an exception, on the contrary, large non-linear interactions are expected due to strong tides and winds and a complex bathymetry.

Because of the large size of the PCS and shelf-break regions, satellite altimetry data combined with in-situ observations offer a unique dataset to achieve our objectives. In-situ time-series measurements are necessary to provide information on the vertical structure of the ocean and quantify the missing portion of the high-frequency variability that cannot be determined from the altimeter because of its limited time and space sampling. Scarcity of in- situ data prevented such quantification in the PCS and shelf-break regions. We thus propose to deploy an array of current meter moorings, bottom pressure recorders (BPR), conductivity- temperature (CT) sensors and a fully equipped oceanographic buoy during two years. Current meter moorings, CT sensors and the buoy will be deployed during the first year over the Jason-3 satellite altimeter track #26, covering the northern portion of the PCS and MC. Then instruments will be recovered and redeployed for another year along a zonal section at 44.7oS. BPRs will be deployed during the two years along the shelf-break. This scheme will allow to simultaneously monitor the PCS and MC flows. The new data will be analyzed in conjunction with historical in-situ and satellite datasets. Improved understanding on the dynamics of both regions will also have an important socio-economical impact. The PCS and adjacent shelf-break are one of the most productive areas of the World Ocean. Furthermore, these regions have a significant impact on the balance of atmospheric CO_2 and therefore possible fluctuations may impact the climate.

Thus, our proposal is part of several of the research themes listed in the Joint Research Announcement (JRA) CNES-DSP/OT12-2118 page 5-6 and clearly address basic research questions listed on page 4 of the same call.

The project will use existing resources from two countries, France and Argentina. Deployment and recovery of the instruments will be carried out from R/V Puerto Deseado (CONICET, Argentina). Most of the equipment to be deployed will be made available by INSU national park, LOCEAN-IPSL (France) and SHN (Argentina). Funds are essentially requested for personnel, missions and consumables.