Climatology and circulation of the Azores-Canary region by Data-Interpolation Variational Analysis

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Abstract

The Azores-Canary region, located between NW Africa and the Azores archipelago, is characterized by easterly wind forcing with mesoscale variability induced by the presence of the Canary archipelago in the southern coastal region. Considering that climatologies are frequently used to initialize hydrodynamic models, we believe that having high-resolution gridded fields can improve the results of such models.

3.2 Finite-element mesh

The triangular-element mesh (Fig. 3) allows a very high resolution of the coastline, while usual methods (Optimal Interpolation, Ganski, 1966; Behringer et al., 1997) deal with horizontal resolutions from 1 to 0.25°. For this reason, Diva is a more appropriate method when studying coastal processes such as upwelling. Moreover, the mesh is adapted to the corresponding contour, which depends on the depth where the analysis is performed (Fig. 3b). This limitation of the domain of computation is particularly important when islands are present.

4 Results

We present some results of gridded fields reconstructed with the help of Diva software using a dataset gathered from several databases. The fields are obtained with the following parameters:

- \(L = 1°\)
- \(\lambda = 0.1°\)
- \(2\mu = 3\times 0.005°\)

These values were chosen so that we obtain smooth fields that we will compare to other climatologies.

Fig. 3 shows the surface temperature fields for the months of January, April, July and October. In both cases the upwelling is clearly observable, with the lowest temperature between Cape Bojador and Cape Juby and off Cape Ghar in July.

5 Discussion

Comparison with surface temperature maps (Fig. 6) extracted from the World Ocean Atlas 2001 (WOA01, Roemmich et al., 1995) underlines the absence of cold fronts in Sec. 3. In this case, island effects are not taken into account during the analysis process and their representation is limited by squares.

Acknowledgments

Diva was developed by the GHER, and improved in the frame of the SeaDataNet project, an Integrated Infrastructure Initiative of the EU Sixth Framework Program. A Federal Grant for the Research, Belgium, and a travel grant from the French Community of Belgium facilitated the author stay at the University of Las Palmas. The map of the Fonds pour la Formation à la Recherche dans l’Industrie et dans l’Agriculture (FRIA) is greatly appreciated.

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