



A high-resolution numerical study at the Canary Islands off Northwest Africa

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The Canary Island archipelago lies partially within the upwelling region off the northwest coast of Africa where it perturbs the southwestward flowing Canary Current. The circulation around the islands is complex, as has been revealed in studies based on satellite imagery and from in situ data. Cyclonic and anticyclonic eddies are shed by the islands. Filaments of cold upwelling water extend from the African coast and interact with the island eddies. However, our understanding of these mesoscale features and their interactions is still limited by the sparsity of data available.

Few modelling studies have been done for the Canary Island region, and none has yet specifically addressed the dynamics of the island and coastal circulation. A high-resolution regional ocean model (ROMS) configuration has been developed to study the dynamics in this region. We take an offline-nesting approach: A large domain that covers the Canary Basin at 7.5-km resolution feeds two successively finer domains of 3 and 1 km. The 1 km grid is focused on the Canary Islands and nearby African coast. The surface and boundary forcings are climatological. Results at the basin scale have shown a good agreement with the observed regional seasonal cycle.

Here, we present preliminary results from the nested solutions where eddies, fronts and filaments are found in abundance. Model eddy conversion terms confirm the observed seasonal cycle of eddy generation, and point to both baroclinic and barotropic processes as sources of instability. Submesoscale activity exhibits a pronounced seasonal cycle which is consistent with previous studies in other regions. Time series of drag and lift forces at the island of Gran Canaria are discussed that show the high variability of the incident Canary Current and the associated eddy generation process.