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Fragmented coastal boundary layer induced by gap winds

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The oceanic impact of offshore-localized winds in the NW Iberian Peninsula was studied. Satellite and in situ observations showed the formation of plumes protruding offshore from the coast. To study the dynamics of such episodes tee Coupled-Ocean-Atmosphere-Wave- Sediment Transport Modeling System (COAWST) was used to reproduce the coastal conditions of the nortwestern Iberian Peninsula, allowing the concurrent representation of local winds, waves, currents, and rivers runoff. The use of coupled models is of outmost importance in order to accurately study the impact of the local winds on the coastal currents. The NW Iberian Peninsula has prominent capes, promontories and submarine canyons, which produce persistent hydrodynamic features. Thus far, the scientific literature shows that the western Iberian rivers produce a recurrent combined plume often denominated as the Western Iberian Buoyant Plume (WIBP) which increases the stratification of the water column and produces a vertical retention mechanism that keeps the biological material inshore. The WIBP extends northward along the coast (over the inner-shelf), and forms a front with the warmer and more saline surface (offshore) waters. However during episodes of strong offshore winds this coastal boundary layer is broken interrupting the WIBP. Coastal orography allows the formation of down-valley winds that produce coastal jets, promoting the offshore transport of pollutants, larvae and sediments.

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