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Spatial and Seasonal Distributions of Frontal Activity over the French Continental Shelf in the Bay of Biscay

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Abstract

The frontal activity in coastal regions remains a research field where a large number of open questions needs to be addressed to quantify the potential impact of these processes on dependent systems (*e.g.* biogeochemical activity). Spatial and seasonal distributions of Sea Surface Temperature (SST) fronts (~ 1 -100 km) in the vicinity of main French rivers, Gironde and Loire, are explored over the continental shelf North of 45°N in the Bay of Biscay. A high resolution (1km spatial and daily temporal resolutions) dataset of 11 years (2003 to 2013) remotely sensed SST by MODIS sensor onboard Aqua and Terra satellites has been investigated and compared with coastal numerical model experiments. The detection and characterization fronts with fluctuating amplitudes is achieved through the Singularity Analysis (*i.e.* the process of calculating the degree of regularity or irregularity of a function at each point in a domain). Seasonality of frontal activity in the Bay of Biscay is then described based on the long-term satellite SST archive and coastal operational model simulations. The identified hot spots of higher frontal occurrences correspond on one hand to previously observed features (*e.g.* tidal fronts) but also reveal new features. These are investigated to identify fine-scale dynamical drivers. In winter, density fronts

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