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CHARACTERIZATION OF FRESH WATER ARRIVAL EVENTS FROM THE PLATFORM TO THE RÍAS BAIXAS

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Abstract: The WIBP or "Western Iberian Buoyant Plume" is a river plume formed by runoffs from the rivers discharging on the western margin of the Iberian Peninsula, especially the Miño River and the Duero River. Its entry in the Rías Baixas has been registered using salinity measurements at different points of the rias, i.e. using salinity as a proxy for the presence or absence of the plume [1][2].

River contributions are one of the sources of nutrients in coastal areas, so when the WIBP enters the mouth of the rías produces a fertilization of the area and, sometimes, triggers phytoplankton blooms. Some of these are proliferations of certain dinoflagellates, associated with less saline waters, which give rise to what is known as "red tides" or "HABS" (Harmful algae blooms) [3]. During this HABS, shellfish extraction is prohibited implying an economic impact for the aquaculture industry.

The identification with a proxy based only on salinity measurements of every event of the WIBP in the Rías Baixas is difficult due to the variety of meteo-oceanographic conditions, discharges regimes of the internal and external rivers [5][6] and circulation patterns (figure 1) under which these events occur.

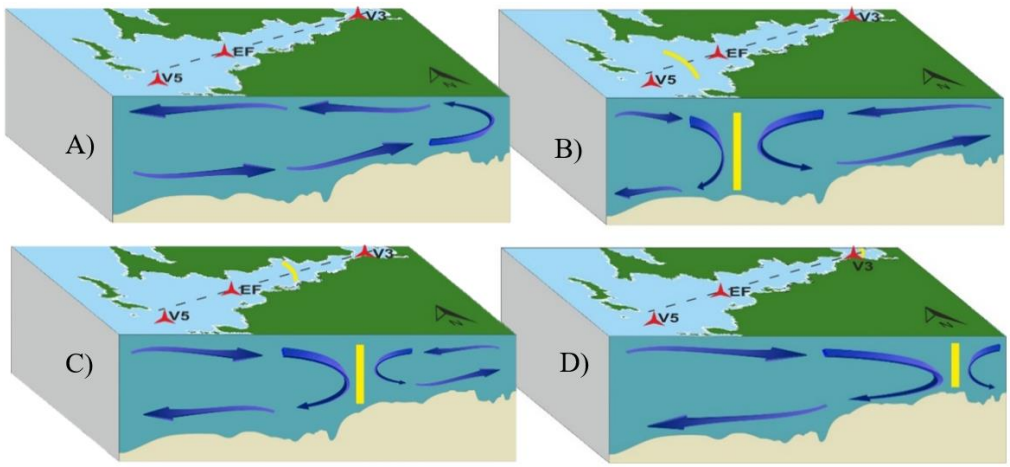

Fig 1.- Circulation patterns depending on the conditions of upwelling or downwelling and its intensity. A) Upwelling, B) "Slight Downwelling", C) "Moderate Downwelling", D) "Intense downwelling event". The yellow bar places the front that is formed when the positive circulation induced by the internal river is opposed to the reverse circulation induced by the downwelling.

In order to detect the entry of the WIBP through a salinity proxy, it is necessary that the horizontal salinity gradient has been reversed in the ría, which in some situations does not occurs despite the entry of fresh water into the ría. Therefore, in this work we intend to evaluate the plume-sensing capacity of this proxy and to assess other measurement platforms for developing a multi-platform proxy (figure 2) that would improve the detection of plume-intrusion events. This work also aims to characterize under which meteo-oceanographic and river discharge scenarios these intrusion events occur. For doing so, several observational platforms and instruments have been used combining different sensing technologies applied to marine observations. ADCPs, HF Radar and CTD observations gathered from RAIA Observatory have been analysed.

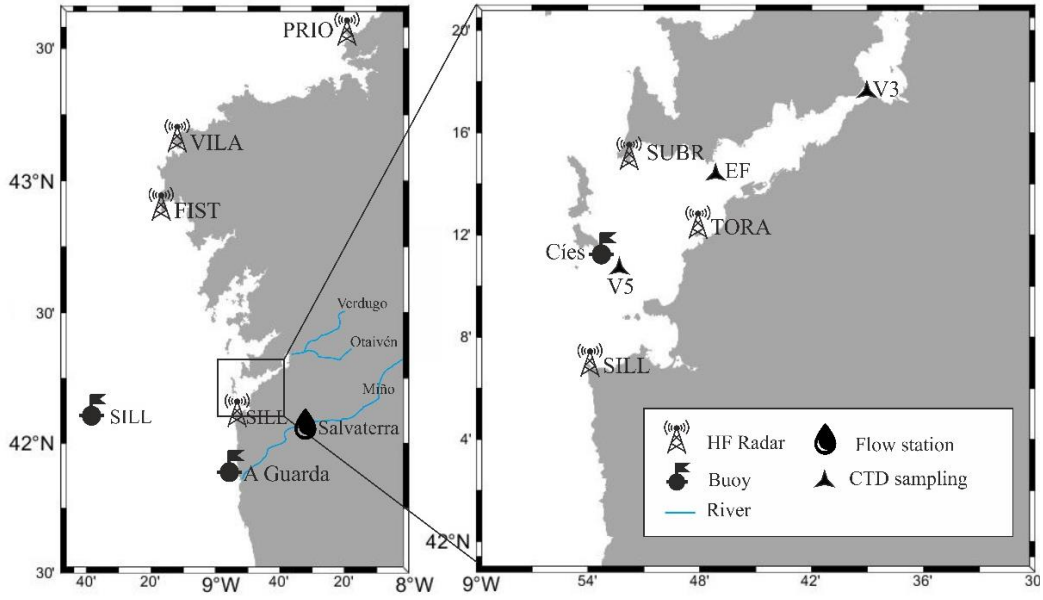

Fig 2.- Location of the different measurement platforms.

The multiplatform (HF Radar in the south mouth of the Ría de Vigo and the ADCP of Cíes, in conjunction with salinity and runoff data from the Verdugo-Otaivén and Miño Rivers) data analysis showed that several WIBP entry events were not detected using the classic salinity proxy, so this proxy might not be so well suited to assess the presence of WIBP. More multiplatform measurements, taken at a higher sampling rate, are needed to capture the whole spectrum of WIBP entrance events in the Ría de Vigo.

Key words: *Multiplatform, proxy, Rías Baixas, salinity, WIBP.*

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