



## **Impact of hydrodynamics on the ecology of Douro coastal waters**

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Two oceanographic campaigns were carried out off western continental margin in Douro river influenced area. At standard depths, down to 250 m for physical and chemical parameters and to 50/75 m for biological parameters, sampling was undertaken along three transects, totalizing 23 stations.

Different conditions of river flow and upwelling prevailed over the study periods. In March 2005, Douro river flow was  $220 \text{ m}^3\text{s}^{-1}$  and upwelling was absent, while in July 2004 flow river was  $100 \text{ m}^3\text{s}^{-1}$  and an upwelling event occurred. River plume was more pronounced in winter, when salinity below 36 extended  $\sim 40$  km over the shelf. In summer the plume was restricted to  $\sim 28$  km offshore and marked upwelling effects were revealed by surface temperatures below  $18^\circ\text{C}$  between 20-30 km offshore. The distinct river discharges were reflected on the nutrients status observed: higher concentrations of nitrate, phosphate and silicate in March 2005 ( $12.0 \mu\text{M}$ ,  $0.30 \mu\text{M}$ ,  $7.0 \mu\text{M}$  respectively) and lower concentrations in July 2004 ( $1.5 \mu\text{M}$ ,  $0.25 \mu\text{M}$ ,  $1.5 \mu\text{M}$  respectively). In this last period the uprising and accumulation of nutrients on the shelf ( $11.0 \mu\text{M}$  nitrate,  $0.8 \mu\text{M}$  phosphate,  $8.0 \mu\text{M}$  silicate) was detected. Simultaneously, a decrease of dissolved oxygen ( $\sim 2.5 \text{ mg L}^{-1}$ ) was noticeable, pointing out to the occurrence of intense mineralization processes during the upwelling event. Moreover, overlapping the nutrient accumulation, phytoplankton biomass developed mainly below the thermocline, attaining  $5.0 \text{ mg m}^{-3}$  of chlorophyll *a* and total phytoplankton reached  $120 \text{ cel mL}^{-1}$ . In winter, values of chlorophyll *a* of only  $3.0$

mg m<sup>-3</sup> were measured at surface, corresponding, nevertheless, to the phytoplankton maximum number of cells (220 cel mL<sup>-1</sup>). This apparent disagreement results from dominance of different species of Bacillariophyceae in summer and winter, being predominant species with greater biovolumes and higher chlorophyll *a* content, in summer. On the other hand, besides Bacillariophyceae dominating at inner-shelf, another group, Dinophyceae, was most abundant at middle-shelf in this last period.

These observations indicate the relevant impact of hydrology changes on the nutrient status and phytoplankton community structure in this coastal area.