

enriched waters especially in the summer months. Upwelling regions are characterised by high productivity and increased export of organic matter into the sediments. Closely related to upwelling are high productivity filaments, which are generated at continental capes. Investigation of sedimentary organic carbon and stable isotopes revealed a clear imprint of upwelling in near coastal surface sediments at the eastern margin of the Canary Basin. Surface sediments underneath the Cape Ghir filament region also showed an imprint of higher productivity comparable to results of particle sinking studies in a regional oceanographic model. The variability of upwelling and filament activity through time was studied on sediments of two near coastal (GeoB4223 and 4240) and two offshore sites (GeoB4216 and 4228). Organic matter accumulation at these sites is controlled by varying upwelling intensity, varying filament intensity and longitudinal shifts of the upwelling area due to sea level changes. The observed heterogeneity in sedimentation patterns may be explained by different contributions of these influences at the different sites. However, two general trends can be derived from our data: 1. Organic carbon accumulation rates are higher during glacial compared to interglacial times, indicating intensified upwelling during glacial times. 2. Filament activity follows the precessional cycle, closely linking the filament activity to trade wind intensity.

### ***HYDROGRAPHIC CRUISES OFF NORTHWEST AFRICA: THE EASTERN BRANCH OF THE CANARY CURRENT AND THE CAPE GHIR FILAMENT***

Oral

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During Fall 1995 and Fall 1997 two hydrographic cruises were done with the R/V Hespérides between the Iberian Peninsula and the Canary Archipelago, with special coverage of the Cape Ghir Filament region. XBT, CTD and ADCP measurements are reported for these cruises. Synoptic XBT measurements, using opportunity ships, were also taken along several short and long sections in order to have a closed box for the whole eastern Canary Basin.

The results indicate a high complexity of oceanographic processes for the region. The far-field measurements indicate the Canary Current flows eastward, mainly north of Madeira. A significant fraction of this flux, about 1 Sv, flows into the African slope and recirculates southward, approximately parallel to the coast, along a rather narrow band towards Cape Ghir. The mesoscalar structure of the Cape Ghir filament is very complex and the measurements suggest that a fraction of the flux continues southward while another portion recirculates into the interior ocean.

The recirculation of the eastern branch of the Canary Current along the narrow band over the continental slope and platform is undoubtedly linked to coastal upwelling. When the easterlies intensify the upwelling system develops with an increase of the coastal baroclinic jet. This jet feeds from upper thermocline waters in what constitutes an active vertical circulation cell. However, in the case of a coastal region with a limited horizontal extension there must also be horizontal influx and outflux, giving rise to a horizontal circulation cell. Both cells must interact, adjusting their

intensity to the external forcing mechanisms. In a situation like the one observed during the 1997 Fall cruise the vertical cell weakens and the flux from the interior ocean into the coastal region has to be accommodated by the horizontal cell.

Another interesting aspect is the existence of subsurface water with a maximum in both salinity and aluminum, just under the seasonal thermocline, covering the filament region. This water probably has its origin in the upper thermocline waters of the Canary Current. The complexity of the region is also apparent by the presence of a poleward undercurrent over the slope. This current over the Aghadir Canyon is the likely responsible of a subsurface anticyclonic gyre located over the head of the Canyon.

## ***HYDROLOGICAL STUDY OF MOROCCAN ATLANTIC COAST FROM 1994 TO 1998***

Poster

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Pelagic ecosystem evolution off Moroccan coast relies on space and time variations of upwelling phenomenon. This latter is the major source of fertilisation of the euphotic zone through cold water and nutrient rich ascension, which is necessary for the enhancement of the marine ecosystem productivity.

The position of active centres within upwelling areas, their seasonal and annual variation , and the level of immersion study taking into account hydrological (temperature, salinity, dissolved oxygen), chemical (nutrients) and biological parameters(chlorophyll 'a' and primary productivity) that allow in following production areas in such system, and its linkage to the trophic process initiating from phytoplanktonic organisms.

The present study, held between 1994 and 1998 during summer and winter seasons, focus on mainly the limitation into four zones in terms of upwelling of deep cold water :

- 1- Zone 1 : cape Cantin - cape Ghir
- 2- Zone 2 : cape Draa - cape Juby
- 3- Zone 3 : Boujdor - Dakhla
- 4- Zone 4 : cape Barbas - cape Blanc

Zone 1 and 2 are featured by an upwelling activity during summer. Whereas the two others are rather nutrients rich influenced by both upwelled waters and introduction of SACW (South Atlantic Central Water) northward.