Changes on Benthic Community Promoted by an Artificial Sea-Connection in a Brackish Coastal Lagoon (St. André, SW Portugal)

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St. Andre (150 ha, ca. 1.5m average depth) is a land-locked lagoon isolated from the sea except during a short period in early Spring (*ca.* 1 month), when an artificial channel is opened through the sand barrier. Seasonal variation of this lagoon has the following main phases: i) Connection with the sea, which leads to a sudden decrease in the water level, salinity increase, decrease of accumulated materials exported to the sea and colonization by marine species; ii) Summer period, with increasing temperatures, the occurence of anoxia near bottom (and possibly dystrophic phenomena), increased water concentrations of nutrients released from the sediment and reduction of the species number; iii) Rainfall period, with loading of nutrients, strong reduction of salinity and colonization by limnetic species.

During the 1978-1985 period, an effective wash-out and sea water renewal only occurred in 1978, 1979 and 1985. Otherwise the connection either did not exist (1981, 1982) or was inadequate (only a few days - 1984, or too late in the year - 1980, 1983). As a consequence increasing amounts of organic matter accumulate in the sediment leading to dystrophic processes (BERNARDO *et al.*, 1988) and input of marine species was non existent or low, promoting an impoverishment of the marine component of the fauna and a decrease of the benthic diversity (CANCELA DA FONSECA, 1989; CANCELA DA FONSECA *et al., in litt.*).

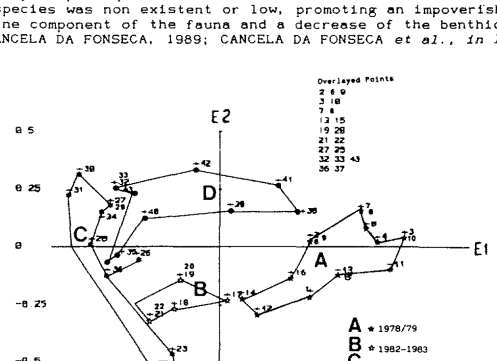

Fig. 1 - Q ordination (PCO, PHI corr. coeff.) of the macrobenthos global binary matrix (sediment types per season).

Ordination of the macrofaunal disponible data concerning the period refered above (Principal Coordinate Analysis - PCO - carried on the similarity matrix obtainned with the PHI correlation coefficient upon the presence-absence species data) suggests, during 1978-1985, the existence of a benthic community cycle with the following main phases (Fig. 1): i) A major influence of the sea component in the fauna (1978-1979), before the start of the irregularities concerning the traditional artificial opening (benthic community dominated by a marine pool of species); ii) A more limnetic situation after the non-opening period (1982,1983,1984), leading to benthic communities restricted to a few lagoonal species or dominated by a continental pool of species; iii) Probable transitional situation (1985), with the start of a recovering process after the re-establishment of the traditional opening procedure, with the increase of the marine component of the benthic fauna. Similar results have been repported from the mediterranean lagoons.

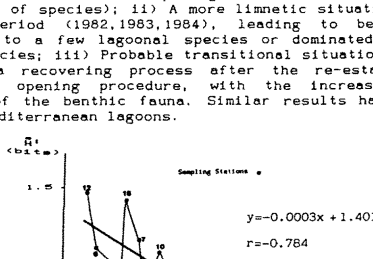

Fig. 2 - Average specific diversity related to the distance from the inlet channel (St. André Lagoon).

This interpretation is also suggested by the evolution of the benthic community structure average with the distance to the local of the inlet channel (Fig. 2). The negative correlation between the community structure and that distance ($r=-0.784$, $p<0.001$) emphasizes the importance of the marine component of the fauna in the benthic community of this system. This is also supported by the study of the post 1985 period (CRUZ, 1989).

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