IRONAGES CRUISES 2002.

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R.V. Pelagia in Funchal.

For the IRONAGES project , 2 cruises with R.V. Pelagia were conducted in 2002. The first cruise, in March 2002, aimed at studying iron coming from sediments. Main study area of this cruise was a gradient from the continental shelf to the abyssal plain. For this purpose a transect from the English Channel to the Gulf of Biscaye was selected.

The main objective of the IRONAGES 3 cruise (October 2002) was to witness and to quantify a natural wet deposition event of iron-rich dust from the Sahara, and to follow a phytoplankton bloom development which might result from this event. In order to do so, the total deposition of iron from the atmosphere to surface seawater was estimated, and the soluble fraction of the iron entering seawater from the atmosphere were determined. Further, the chemical form of iron both in terms of its redox speciation and the extent to which it is organically complexed were identified. For this cruise, R.V. Pelagia left from Ponta Delgada, spend 3 weeks in a "box" between 32 - 25 N, and 20 — 25 W, had a brief stop in Funchal and ended its cruise in Valencia.

Results of the field sampling.

The CTD was equipped with standard NOEX bottles, and dedicated Go-Flo watersamplers. These latter were used for trace metal clean sampling. Shallow CTD casts were done in order to investigate the vertical distribution of trace metals, macro-nutrients and phytoplankton. Next to these CTD cast, special cast were done almost every other day. The special casts were done for the collection of nutrient rich, trace metal poor water for experiments with phytoplankton. The use of Go-Flo bottles on the CTD frame enabled check for trace metal cleanness of this frame and the Kevlar wire.The results were very satisfactory: It was demonstrated that the combination of the Kevlar wire, the specially coated CTD frama and the Go-Flo bottles resulted in watersamples without Fe contamination.

New coated CTD frame with NOEX and Go-Flo bottles.

Two dust samples were mounted on the bridge of Pelagia. One was dedicated to the sampling of trace metals (acid washed filters), one for the sampling of major ions. These dust samplers were continuously operated during the cruise. Only once dust was clearly visible on the filters.

Dust samplers on bridge of Pelagia. (Photo's: Klaas Timmermans)

Results from shipboard experiments.

Experiments with the natural phytoplankton population.
For these experiments, water from the Chlorophyll maximum was collected with the Go-Flo watersamplers. This ensured trace metal clean collection of the water. Subsequently, incubation and handling were done inside a clean container, at ambient temperature and light conditions. As the water had low N, P and Si concentrations, trace metal clean nutrients were added. Routinely, two treatments were incubated: Plus dust and control incubation. The indigenous phytoplankton showed little if any effect on the additions of the dust.

Experiments with single species phytoplankton cultures.
For these experiments, water from 500 m depth was collected with the Go-Flo watersamplers. This ensured trace metal clean collection of the water. Subsequently, incubation and handling were done inside a clean container, at ambient temperature and light conditions. Given the nutrient concentrations at 500 m depth no nutrients had to be added to these cultures. Routinely, two treatments were incubated: plus dust and control incubation. The phytoplankton species that were used were: *Prasinococcus* sp., *Pelagmonas* sp. and *Ditylum brightwelli*, brought from the home laboratory. In these experiments the phytoplankton was used as indicators of bioavailable F originating from duste. The small species (*Prasinococcus* sp., *Pelagomonas* sp.) did not respond to the addition of dust. *Ditylum brightwelli* growth rates, in contrast, was stimulated by addition of dust.