

On board Research Vessel *Pelagia* in the equatorial North Atlantic, Saturday 16 November 2013

Dear all,

We have been a week at sea now, right about time for a first report on our whereabouts onboard the *Pelagia*. In the morning of Saturday 9 November we left Las Palmas de Gran Canaria and set sail towards the South to the working area of Traffic II. Traffic is the NWO (Dutch NSF) funded project that aims at monitoring and collecting Saharan dust along a transatlantic transect at 12°N. The project has been joined by the ERC (European Research Council) funded project DustTraffic, which makes use of the same transect across the Atlantic, while complementing it with a number of new instruments.

During the first cruise –of a set of four– last year, we deployed five moorings consisting of two sediment traps each and a whole lot of other instruments including current meters, temperature- and salinity loggers, and instruments to measure the amount particles sinking towards the ocean floor. During the present cruise we will re-visit, sample and re-deploy these moorings. In addition, this year we will add three dust-collecting buoys.



Planned track of the (Dust)Traffic Transatlantic array of sediment traps and dust-collecting buoys.

Our first station was off the coast of Mauritania, about 200 nautical miles offshore Cape Blanc. At this site, the MARUM-Bremen group has been collecting dust with two sets of moored sediment traps for 24 years now. Here we deployed buoy Carmen, named after the Bremen PhD student Carmen Friese. The deployment was a first for everybody onboard the ship and it encompassed quite a complicated operation: we were all impressed by how many different lines, cranes, winches, reels, more cranes and more winches were needed to get this job done. Yvo Witte and his team (Leon, Jan-Dirk, Bob, Gert, Roel, Martin, and Jose) in close cooperation with Captain John Ellen and his staff (Joep and Alle) managed to smoothly lower Carmen's buoy into the water, where she turned out to be really stable and able to handle the relatively rough conditions (a strong breeze of about 15m/s) very well!

Meanwhile we are on our way to the transect at 12°N. Early this morning, at midnight exactly, we arrived at station M0 where we retrieved a beautiful multicore (11 sediment-filled tubes of about 35cm long) and later in the morning a 9.3m piston core. We directly opened the core to see what's inside and to photograph and XRF-scan it. Directly after the sediment core was on deck, we continued sailing to the very first mooring station M1. We'll arrive here tonight just before midnight and start a whole program of CTD/water sampling, plankton tows with the multinet, recovery of the mooring, another piston core and finally re-deployment of the mooring.

For an idea of what our moorings look like, please have a look at the sketch to the right. Each mooring, which has a total length of about 4km, has two sediment traps (yellow) at 1200 and 3500 m water depth, kept upright by big floats (orange). The sediment traps consist of a huge funnel, collecting anything sinking through the water column, which ends in a cup fixed to a carousel. This carousel contains 24 of these cups, and it rotates the cups underneath the funnel on a pre-programmed scheme. The whole thing is kept at position by a 3-Ton weight on the seafloor. It is held by two releasers which can be triggered by a radio signal to let go, so that the whole system moves to the sea surface to be picked up by us. This way we'll not only continuously collect Saharan dust deposited on the ocean surface and sinking towards the sea floor, we'll also collect the remains of plankton and algae that live in the surface ocean and which also sink to the ocean floor.

#### So what!?

The big hypothesis we'd like to test is: do Saharan dust outbreaks have a fertilising effect on the Atlantic Ocean? And if so, can dust fertilisation be used to sequester CO<sub>2</sub> from the atmosphere?

After four years and two more cruises, and by comparing the trap results with the buoys and sea-floor sediments, satellite images, and culturing experiments, we hope to have quantitative answers to these questions.

Meanwhile, we very much enjoy the fantastic hospitality onboard the Pelagia. We are spoiled with excellent food by cook Iwan and his assistant Alex! Besides, we are very pleased to be in this warm part of the Atlantic Ocean where the sea has a temperature of 29°C, and the sun mostly adds a few degrees to that.

For more info on our cruise, please have a look at [www.stuut.tv/html/pe378.html](http://www.stuut.tv/html/pe378.html). In addition, you can read a ship's diary on the nioz website at: <http://www.nioz.nl/scheepsjournaal> Finally, our journalist Ronald Veldhuizen writes a liveblog on the Volkskrant site, which you can read here: <http://www.volkskrant.nl/vk/nl/12587/Ware-Wetenschap/article/detail/3542625/2013/11/11/Liveblog-de-reis-van-Jan-Berend-Stuut-naar-het-woestijnstof.dhtml>

Many greetings to all of you from the Pelagia in the equatorial North Atlantic!  
On behalf of the ship's- and scientific crew,  
Jan-Berend Stuut

