Dinophytes seminar – Stay connected! **Monday September 6, 5 pm CEST, GMT+2.**

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Where do dinoflagellate cysts in marine sediments come from?

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Finding the answer on this question is of major importance both in studies investigating the dynamics of harmful algal blooms as well as in paleo-environmental studies where fossilized cyst associations in sediments are being used to reconstruct past upper ocean environmental and oceanographic conditions at times of deposition.

To address this question it is important to know where dinoflagellate cysts are being produced in the upper water column and if and how they are laterally and/or vertically transported, dispersed and/or resuspended during the settling and embedding process. Despite increasing information about these processes in coastal environments, extremely little information is known from the open ocean.

To decrease this gap of information we used the excellent sea going facilities at the MARUM/University of Bremen to study the track of dinoflagellate cysts from their production towards embedding in sea floor sediments in the open ocean upwelling system off Cape Blanc (NW Africa). This region is characterised by permanent upwelling along the shelf break, bringing nutrient rich deep waters to the ocean surface. Furthermore frequent dust storms blow trace element rich Sahara sediments into the area. The combination of upwelling and dust input results in this area being one of the most productive regions in the world.

To study the production, vertical/lateral transport and embedding/resuspension of dinoflagellate cysts we collected the upper ocean cyst export production with free drifting traps that were placed in active upwelling cells and in a more offshore located upwelling filament. By following the traps several days with a daily collecting of cysts at three different water depths, information about the species succession was obtained. Cyst associations of the traps were compared to associations in selected deeper water layers (e.g. nepheloid layers) by in-situ pumps as well as surface sediments.

During this lecture I will present the results from our studies carried out at times of maximal upwelling intensity in November 2018 and, for the region, minimal upwelling intensity in August 2020. Results allow the recognition of both vertical and lateral transport of cysts in the water column during the settling process. Lateral transport of cysts in the region appeared related to the presence of nepheloid layers that origin at the shelf break and can be followed to about 130km offshore. Furthermore, the results show that at times of maximal upwelling, the deep ocean is spiced by resuspended cysts that origin at the coastal shelf area.