

7th Weekly Report SO284, Emden-Emden

Aug. 9 - Aug. 15, 2021

With the end of this week, we are also nearing the end of our campaign, as we will reach Emden tomorrow, August 16. With our arrival on the 16th, we will arrive one day earlier than planned, thanks to favorable conditions during the cruise. As all instruments used during the last two months had to be dismantled and stowed in the containers, this last week was mainly spent preparing our departure in addition to analyzing the collected data. As we were ahead of schedule, it was possible to change the route somewhat and avoid crossing the exclusive economic zones around the Canary Islands, Madeira, Portugal and Spain. Since we did not have permission to measure in these zones, changing the ship's course allowed us to continue our underway measurements. For example, we were able to continue aerosol measurements with the Raman lidar system Polly^{XT}.



Figure 1 Night-time view of the 532nm laser beam from the PollyXT Lidar installed on RV Sonne during cruise SO284. The Lidar measures profiles of atmospheric humidity and aerosols.

The Raman lidar system Polly^{XT} was developed in 2009 at the Leibniz Institute for Tropospheric Research (TROPOS) in Leipzig, Germany. This lidar specializes in upward profiling of humidity and mapping the vertical stratification of clouds and aerosol properties at three wavelengths of frequency-tripled Nd:YAG laser emission (1064, 532 and 355 nm). Of the three wavelengths, the 532 nm wavelength is in the visible range and can therefore be seen by eye at night (see Fig. 1).

Polly^{XT}'s aerosol measurements last week show that we crossed the Saharan air layer west of North Africa and probably also captured some smoke from the California wildfires. Figure 2, for example, shows the 1064-nm range-corrected lidar signal on the way back from Cape Verde to Emden. From 5 to 8 August, Saharan dust could be observed with the Raman lidar between 1 and 6.5 km altitude. After leaving the dust region, several weak aerosol layers were also observed between 1 and 4 km height. Given the current forest fire situation in the northern hemisphere, these layers most likely originated from the smoke of the Californian forest fires that had broken out a few days earlier. Further in-depth analysis of the optical properties of these layers will be required after the cruise.

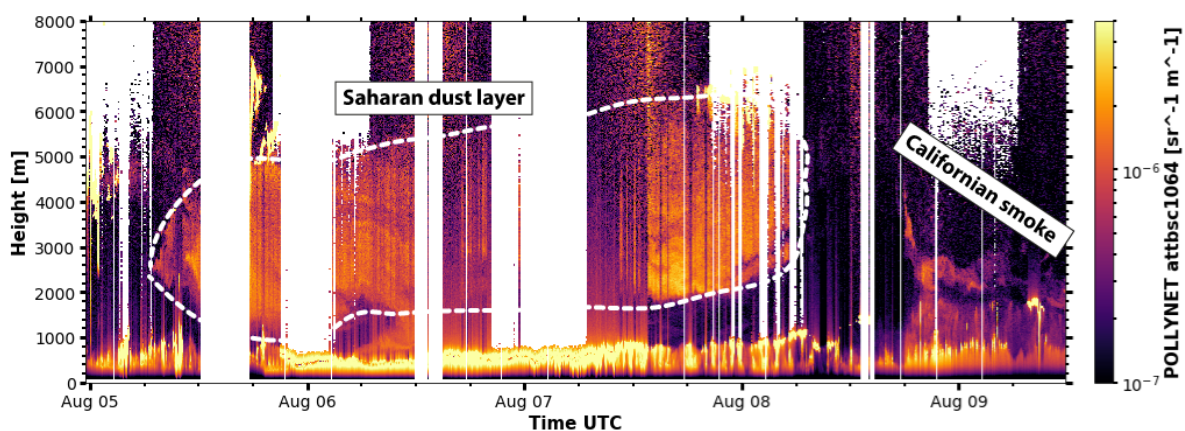


Figure 2 Attenuated backscatter coefficient at 1064 nm from 5 to 9 August 2021. From time to time, the signal attenuation from low liquid-water clouds covered the view to the lofted aerosol layers (Fig. Ronny Engelmann).

On board, all participants are doing well and the mood is still very good. We are now looking forward to home but will miss our time together on the RV Sonne.

As this is our last weekly report for cruise SO284, we would like to take this opportunity to warmly thank Tilo Birnbaum and his crew for their great work and support during this cruise, which contributed significantly to the success of this campaign.

Greetings from the English Channel in the name of the cruise participants of SO284,

Peter Brandt, GEOMAR Helmholtz Centre for Ocean Research Kiel and
Julia Windmiller, Max-Planck-Institut für Meteorologie, Hamburg