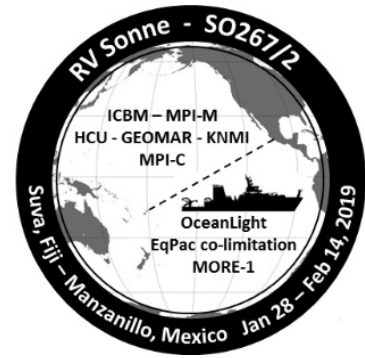


**FS Sonne SO267/2:**

**OceanLight / More-1 / EqPac co-limit**

Suva – Manzanillo

Weekly Report 2: 04 – 10 February 2019

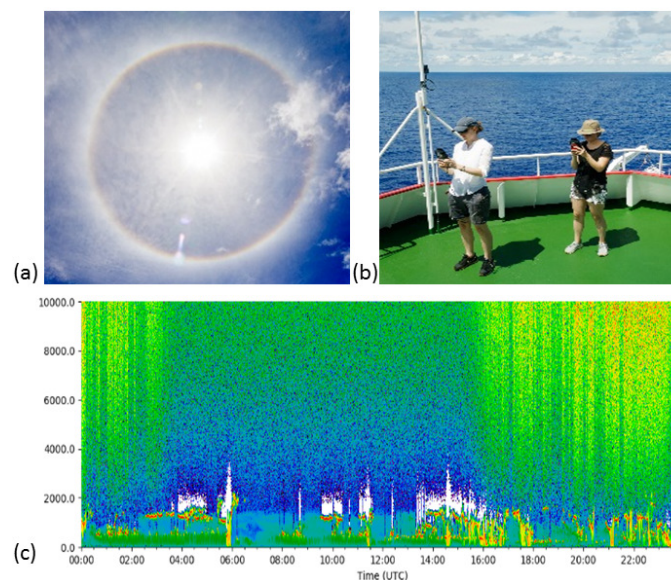


Scientific work this week was characterized by a daily routine of underway and in-situ measurements. The underway systems measured oceanic properties continuously along the transit route. Radiometric quantities were collected at 5-minute intervals by a set of 2 irradiance and 4 radiance radiometers that were installed in the port of Suva (Fig. 1). Data collection began outside the EEZs. A global radiation reference was installed in the fore mast in the upper deck. Bathymetric measurements were also conducted underway.



**Fig. 1:** Radiometer setup onboard RV SONNE (Picture: D. Voss).

The meteorology group collected measurements at a time specific interval. With a ceilometer the cloud height was determined every 15 seconds. These measurements were supported by a cloud camera capturing images every 10 seconds. Information on aerosols in the atmosphere was collected with a MAX-DOAS generating a profile every 15 minutes. When a clear view to the sun was available, profiles with two solar photometers were generated every 20 minutes. Processing and evaluation of collected data was already started onboard.



**Fig. 2:** (a) A near clear sky observation made it possible to observe a halo, (b) data collection using handheld photometric sensors and (c) ceilometer observations on 06 February 2019 aboard RV SONNE (Pictures: S. Dörner).

Outside the boundaries of the EEZs, we deployed a Towfish (Fig. 3a) attached to the crane at distance away from the ship and at a fixed depth. Every 4 hours, surface water was sampled. In the lab, a so-called "clean room" was set up to collect and process samples for trace elements and dissolved in-

/organic nitrogen with minimal contamination (Fig. 3b). In addition, chlorophyll samples were taken and measured fluorometrically on board. A set of samples will be shipped back to the home labs at the GEOMAR (including biogenic silicate, particulate organic carbon, nutrients) for further analyses.

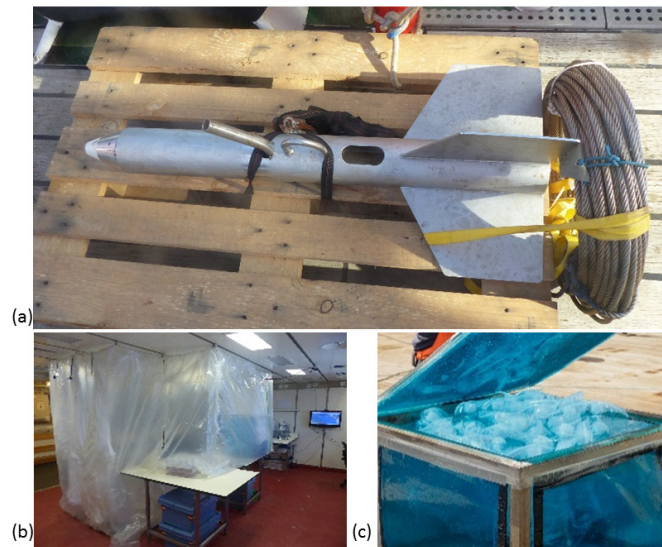


Fig. 3: (a) Towfish on deck RV SONNE (Picture: B. Tietjen), (b) “Clean Room” in the lab on board and (c) incubation chamber outside, at the back of the ship in which samples were treated for 48h under different environmental conditions (nitrogen, ion, zinc limitations) (Pictures: S. Dörner).

Daily underwater light profiling at the stern of the ship was completed at 1400 hrs (Fig. 4). A Satlantic free-fall profiler measured underwater light field up to 200 m, at a distance 20 - 50 m away from the vessel hence minimal perturbations from ship shadow or noise. The comparison of the hyperspectral radiometers in the water with a reference aboard the ship, gives us information about the penetration depth of light and its distribution. On Tuesday 04 February, hyperspectral light properties of the Pacific Ocean at the Equator were observed using the free-fall profiler. From the 10 February two light field station are planned for each day. Furthermore, samples were taken from the underway system of RV SONNE and the Towfish to determine the absorption properties. Besides validation, continuous PSICAM measurements are done in the lab to get more information about influencing parameters within surface waters.



Fig. 2: Satlantic Profiler at the aft the ship. With little speed the instrument will be brought away from the ship (Foto: S. Dörner).

As we crossed the Equator and entered the inter-tropical convergence zone the weather situation began to change significantly. While the first part of the trip was characterized by relatively good weather with low wind speeds and less cloudy conditions. The weather has changed to more cloudy and windy conditions with episodes of rain. The measurements up to now, have been very successful so far and will continue in their fixed grid until the RV SONNE will reach the Mexican EEZ.

In behalf of the scientific party of SO 267/2

Daniela Voss

Sunday, 10th of February