RV MARIA S. MERIAN

MSM126 “Jellyweb Madeira”

February 9 – March 4, 2024

1st weekly report (February 9 – 11, 2024)

Background: The focus of cruise MSM126 “Jellyweb Madeira” lies on the pelagic deep sea, which belongs to the least explored ecosystems on earth. A particular knowledge gap in this system concerns the biodiversity and functional role of gelatinous zooplankton (the “jelly web”). Our overarching research aims during MSM126 are to improve the understanding of deep sea biodiversity and of the structure and functioning of food webs, focusing on the marine systems surrounding Madeira Island in the Eastern Central Atlantic Ocean. To do so, we will conduct habitat and biodiversity exploration and dedicated food web sampling, using a wide range of established and novel in-situ observation (e.g., pelagic and benthic camera observation systems, remotely operated vehicle ROV PHOCA), remote sensing (multibeam mapping, ADCP), measurement (CTD and additional sensor) and sampling technology (various nets, ROV PHOCA samplers, water samplers). Samples will be used both for experimental approaches on board and for laboratory analyses including (meta)genomic and stable isotope analysis after the cruise. Our cruise consortium includes GEOMAR Helmholtz Centre for Ocean Research Kiel (lead), University of Southern Denmark, MARE Madeira/ARDITI Portugal, University of Hamburg, AWI Bremerhaven, Smithsonian Museum of National History, and the University of Western Australia.

Weekly report: After setting up all equipment and laboratories on board of RV MARIA S. MERIAN on Feb. 6 – 9, we departed from Funchal harbor as scheduled on Feb. 9, 2024, 18:00 UTC, with 22 scientists and technicians and the 24 members of the permanent crew on board. The first station RID_D1 in the Madeira Desertas Ridge working area (Figure 1) was reached on Feb. 9 at 19:30 UTC, where scientific operations of MSM126 began with the first CTD-water sampler cast.

Since then, we have been conducting 24-hour operations with near flawless performance of all gears, benefiting from good weather and sea state conditions and the fantastic working conditions on board. Specific work has included two nights of multibeam mapping of the topography and habitats of the Desertas Ridge (Feb. 9, 10), daytime net casts for biodiversity and food web sampling (Feb. 10), the first pelagic ROV deployment (Feb. 11) for biodiversity observations and sampling of delicate gelatinous fauna, three CTD-water sampler casts for filtrations of various compartments of the planktonic food web, eDNA sampling and vertical profiling of the water column (Feb. 9, 10, 11), and successful tests of our towed camera and observation systems PELAGIOS (pelagic) and XOFOS (sea floor) (Feb. 10). Moreover, set-ups for on board respiration-, neurophysiology and behavioral experiments with pelagic gelatinous taxa and amphipods were installed successfully and experiments were initiated.

So far, >150 midwater organisms (see e.g., Figure 2) were individually recorded and sampled for later analyses. This included first records of several taxa for Madeira waters. Notably, the pelagic ROV deployment also included the first successful sampling of delicate gelatinous deep sea fauna with two new custom designed sampling tools for midwater use, D-samplers and a suction sampler, on Feb. 11.

In the coming days, we will continue the exploration, habitat mapping and biodiversity and food web sampling of the Desertas Ridge area with the diverse tool set at our disposal.

Greetings from on board RV MARIA S. MERIAN on behalf of all participants,

Jan Dierking (Chief scientist MSM126)
GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany

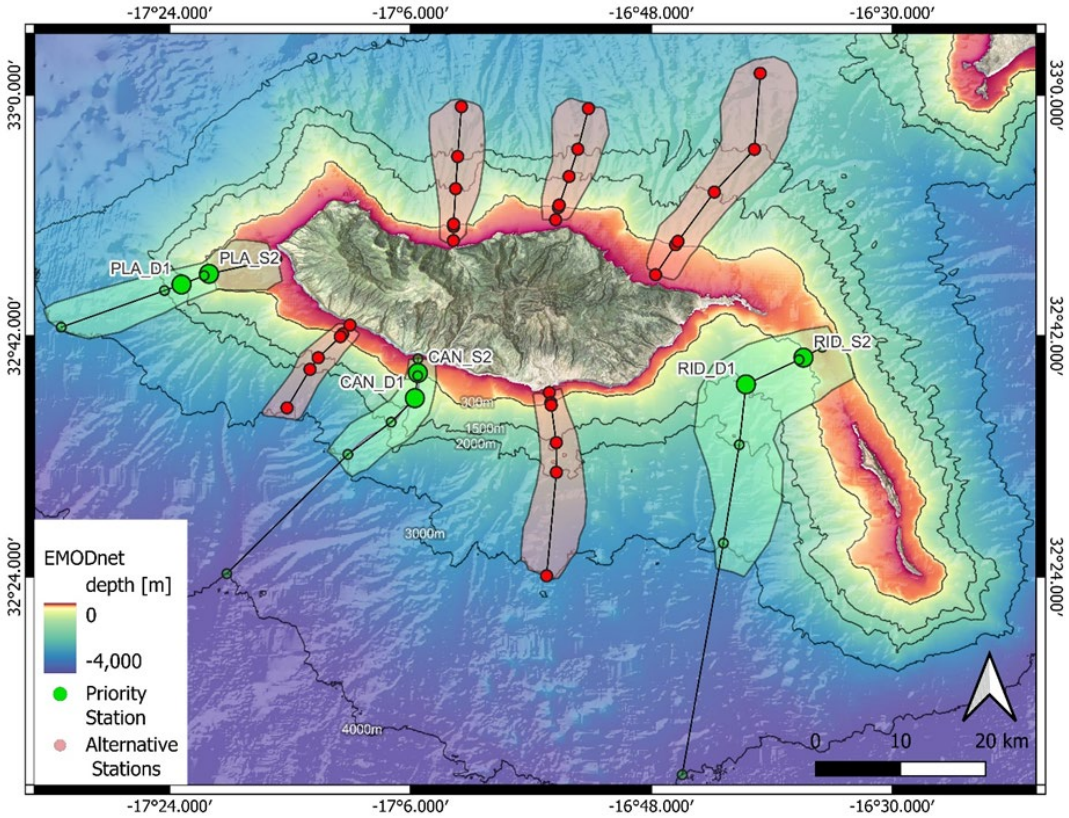

Figure 1 Working areas and stations of cruise MSM126. During the first week, our focus lies on the Madeira Desertas Ridge area ("RID") in the south-east of Madeira, including transects from 80 - 2000 m depth and in-depth food web sampling of the stations "RID_S2" (300 m) and "RID_D1" (1500 m).

Figure 2 Two members of the "midwater world" around Madeira caught during plankton sampling on station RID-D1. Left: the salp *Salpa fusiformes*; right: the amphipod *Streetsia* spec. Photos: K. Osborn