

METEOR M61/1 CRUISE REPORT

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Background:

In the marine environment, a large number of organisms have the capacity to emit visible light or bioluminescence. The Oceanlab ISIT (Intensified Silicon Intensifying Target/Tube) camera is designed to record deep-sea bioluminescence. Previous studies have found bioluminescence recorded with the ISIT lander in the North East Atlantic.

Technology:

For this cruise, the low-light camera was positioned in front of a baited GEOMAR benthic chamber. The whole instrumentation was attached to a GEOMAR Modular Lander, which was positioned using the video launcher.

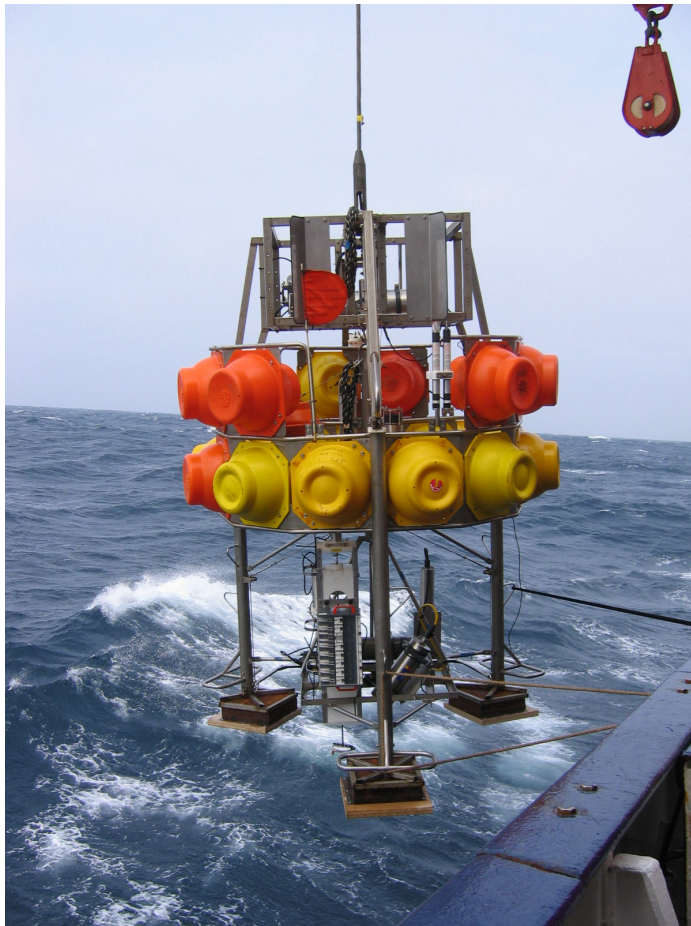


Fig. 1: Deployment of the GEOMAR Modular lander with the Oceanlab instrumentation

Objectives:

The main aim of this cruise was to study benthic bioluminescence in relation to deep-water corals and to determine whether the occurrence of spontaneous (non-stimulated) bioluminescence frequency would change with distance

from the coral mounds. It was expected that bioluminescent emissions would increase in the vicinity of corals, as they are known biodiversity hotspots. Additionally, the collection of potentially bioluminescent organisms, via the altered baited benthic, allowed for stimulated bioluminescence under lab conditions and their identification.

Work on board

During the cruise, 2 successful deployments were achieved.

Deployment 1:

The first deployment took place on Galway Mound (Porcupine Seabight) amongst a coral community (st. 221, depth ~860m). The footage showed no consistent amount of bioluminescence. There was no evidence that bioluminescence is related to any feeding activity but emission of light was observed during the closing of the chamber, probably as a result of mechanical stimulation. The dominant scavengers were found to be lysianassid amphipods and *Synaphobranchus kaupi*.

Deployment 2:

The second lander deployment was on an area of soft at the base of Kiel Mount in the Rockall bank region (st. 285, ~950). This time, there were a large number of eels (*S. kaupi*) and the video footage showed a significant number of bioluminescent events. It is thought that the eels are responsible for stimulating bioluminescence.

Amphipod traps, attached to the ROBIO, recovered a lot of amphipods and ostracods. It was found that the ostracods were responsible for bioluminescence and a pale blue light, visible to the naked eye, was observed when mechanical (shaking) and chemical (potassium chloride solution) stimulation was applied in the lab.

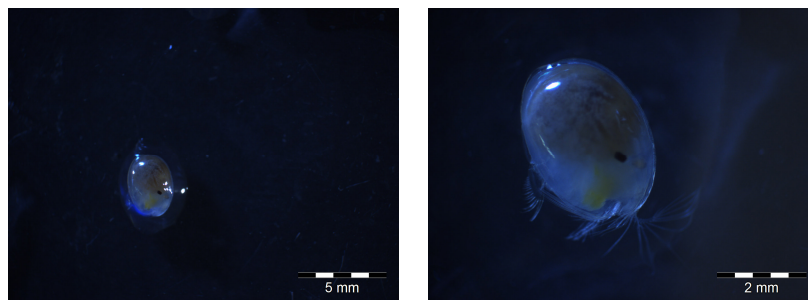


Fig.2: Ostracod bioluminescence

Furthermore, amphipod and ostracod tissue samples were taken and preserved in RNAlater for subsequent analysis of gene expression and eyes were frozen for visual pigment analysis.

Future work:

More deployments need to be done amongst and coral communities to confirm/back up or refute the preliminary results.