

## ♪ On an island in the sun ♪ ...

Located 978 km southwest of Lisbon and about 700 km west of the African coast, Madeira Island is one of the most beautiful places to visit. From the volcanic landscape in the east and the trails in the mountains (Levadas) to the pleasure of diving in the deep-blue Atlantic Ocean, there are so many things to see and do here that it is impossible to get bored!



Eastern tip of the island: Ponta de São Lourenço.



Mountain-peaks seen from Pico do Areeiro.

So it comes as no surprise that about 80 % of the people we encounter on our daily walk to work in the island capital Funchal, are elderly tourist-couples and hikers waiting to be picked up for a levada-walk (the remaining 20 % consist mainly of taxi-drivers and joggers), whereas the locals are hiding from the tourist-invasion somewhere else. 😊

The view on the ocean right outside our office-window (which most hotels here can't compete with) and the chance to jump into the water to cool down or check out the marine flora and fauna are just 2 of many good things we can enjoy here - in the Marine Biology Station of Funchal. It is an institute of the Funchal Municipal Council that is dedicated to research supporting the advancement of marine science and technology in the Autonomous Region of Madeira, and is – again



The Marine Biology Station at Cais do Carvão. We pump the water for our lab straight from the ocean – when the sea's not too rough...



View from the roof-top of the station.



Some snapshots from snorkeling in front of the station: *Ophidiaster ophidianus* and *Abudefduf luridus*.

– GAME’s home for a project in Portugal.

Compared to GEOMAR it is a small station, but it has all the necessary facilities (wet-lab, climate-chamber etc.) to keep an experiment running without a lot of trouble. Besides that, all of the people are easygoing, always ready to help and share their experiences in all fields with us, and never miss out on a good laugh. Projects like MARPROF (dedicated to the development of action plans for food management and exploitation of deep sea fishery), GESMAR (responsible for the sustainable management of marine resources), and BANGEN (the marine genetic database of Macaronesia) are some of the important studies taking place here at the station, not only for Madeira but for the whole of Macaronesia.

Now our study on the abundance and effects of microplastics on marine invertebrates joins this range of projects. The “flower-island”, unfortunately, is no exception amongst the highly frequented holiday-destinations, so that despite the remote location we can still find a lot of rubbish, especially made out of plastic, on the beaches. Considering the usually pretty strong wave-action of the Atlantic Ocean meeting the shores, it is absolutely no shot in the dark to suspect also the presence of microplastic-particles - derived from these larger objects - here.



Some examples of litter we found on different beaches which are all completely crowded by both tourists and locals during summer: Praia Formosa, Prainha, Reis Magos.

As this is a topic that is now being widely spoken, but still relatively little is known about, we all started the project with a lot of questions. It feels a bit like being in a group of pioneers who set out on a mission and are slowly approaching the core of it. This way we found most of the answers to our initial questions ourselves throughout our pilot-studies. It is a huge bonus to have the support and vivid communication not only with your team-partner and supervisor(s), but also with all other GAME-teams at



Filipa presents our first mini-pilot-set-up in the wet-lab. After lots of rearrangements (here with the help of our supervisor/mentor João) we finished constructing our final set-up in the climate-chamber.





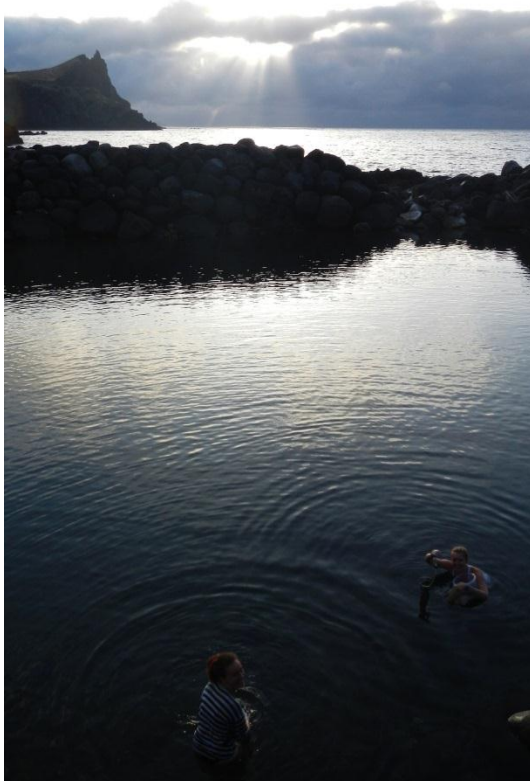
different stations scattered all around the globe.

After weeks of trial and error, broken pumps and poop-checks (for plastic in the faeces) we have now found our study-organisms and the best way to handle them. We screened different species to see if they fit the experiment requirements, but in the end there could only be one winner for us ... (drumroll) ... the sea cucumber *Holothuria sanctori* (Echinodermata). As deposit-feeders that basically vacuum the seafloor, taking up sand and detritus (and – as we know now – also microplastics!) they are the ideal study organisms for this project.



Our study-organism *Holothuria sanctori* and its defensive Cuvierian tubules.

The collection of sea cucumbers at the start was a bit rough due to their habit of shooting sticky threads (Cuvierian tubules) out of their rear end as a defense. This is known as a ‘cuke nuke’ amongst aquarium hobbyists – since the tubules can also contain toxic substances that may kill other marine organisms. However, since we have started the main-experiment most of them are doing great, although a few fellows are passing through a bad time and have demonstrated another superpower: they can eviscerate most of their guts through their bodywall. Maybe it is because of the hot summer or - who knows- it is already a sign for the effects of the plastic. However, we are still in the middle of the experiment and hope that the “cuke-nukes” and -explosions will cease from now



Reis Magos, 7:15 am – cuke-collection-time! Team Portugal gets soaked while João is “supervising” from a safe distance ☺.



130 hand-picked sea cucumbers, the same number of “cuke-nukes”, and a well-earned hif ive later, we (Jenni, I., and Filipa, r.) have completed our morning-mission!



Not so pretty, but effective: *H. sanctori* uses its tentacles to take up sand and detritus – and our microplastic beads!



on. So you see, as all other teams we have had to deal with our share of setbacks, but we also learned to improvise and adjust, so that in most cases we found a solution!

From the typical Portuguese food (espetada, lapas, pudim de maracujá!!!), the amazing landscapes within the beautiful nature that surrounds us, with all of the flowers and the good weather, we have to admit that this is a really awesome location for anyone who wants to try the field of experimental ecology, and who wants to have not only good working-conditions but also plenty of options to spend their free time!



Some impressions from the “flower island”. Due to the mild climate almost everything can grow here.



Scenic Funchal city photographed on a boat-cruise

Soon we are going back to Kiel, with a luggage full of experiences, adventures and knowledge. There we will analyze our data all together and hopefully we will have enough results to come to conclusions about the effects of microplastics on marine animals!

Obrigada e adeus!!! 😊

Filipa and Jenni