

FS METEOR Expedition M152 LISBON 1755



Funchal 02.11. – Hamburg 14.11.2018

1. Weekly Report (02.11. – 04.11.2018)

The cruise 152 of the German research vessel RV METEOR is called “LISBON 1755“. We left Funchal harbor/Madeira Island on early Friday morning on schedule. Some participants arrived just three hours before the departure of METEOR due to turbulence in the air traffic and cancelled flights. We left berth 2 at 05:30 am and clearing it for the huge cruise ships. Before that we had placed and towed containers on the working deck and set up our labs.



Research vessel RV METEOR in the harbor of Funchal/Madeira

Our short expedition will lead us from Funchal to the Algarve coast of Portugal, later on via the Bay of Biscay to Hamburg, where METEOR enters the ~~wharf~~ for refurbishing. On Nov., 4, we started our scientific program that mainly resembles gravity and vibracoring and collection of micro-plastics. The team is composed of researchers from RWTH Aachen University, Cologne and Mainz universities, and the hydroacoustic team of Prof. Huhn of MARUM and Univ. of Bremen. The Portuguese team of Dr. Pedro Costa and the Hydrological Institute and a Spanish colleague of Complutense Univ. Madrid supplement the scientific crew.

The aim of the expedition is to map and sample a coast-parallel transect and two transects perpendicular to the coast of the Algarve off Portugal. This part of the coast was heavily affected by tsunami inundation exactly 263 years ago on All Saints Day 1755 following a strong earthquake offshore. One of the most consequential and impressive natural hazards ever reported destroyed the Portuguese capital. At 09:40 in the morning a very strong earthquake rocked the metropolian area, it was followed

by a second approximately 2 minutes long shaking that caused the collapse of churches, palaces, bridges and towers. A third shock brought the total destruction to one of the cultural centers of Europe, a huge dust cloud covered the sky and the city burned down to the walls. About 60,000 of the ca. 250.000 inhabitants died. The shaking was felt in almost entire Europe and north-western Africa. Peculiar and for the local people strange events occurred in Scotland and Switzerland where unexpectedly lake levels rose, in Sweden and the Netherlands ships were ripped off anchoring.

Three flood waves, i.e. tsunami, hit the Portuguese coastline shortly after the earthquake. Many cities and villages were destroyed, with the exception of Faro that was sheltered by sandbanks, whereas in Lagos the waves overtopped the city walls. The wave height in Lisbon was estimated on the order of 5-6 m; in Madeira 4 m and in Cádiz (Spain) and Cornwall (England) 2 m high waves were observed. Also, the North African coast was severely damaged from Tangiers to Agadir. In the afternoon, waves arrived in Antigua, Barbados and Guadeloupe across the Atlantic, their height was still above 1 m. Up the Guadalquivir river in Andalusia, Seville was reached by the waves. The consequences of this remarkable earthquake affected cultural and societal life in Europe. This epoch may be regarded as the start of process-oriented geoscientific studies.

Deposits of the Lisbon 1755 tsunami have been well studied along the southern Portuguese coast, but the impact of back-wash, the retreating flood into the sea has not been well understood and studied. Mapping and drilling of the sediments is our major goal. We focus on the following scientific questions: Do we find variations in thickness and sediment composition, distribution and preservation of the tsunami layer? What effects on benthic life after tsunami deposition can be observed? Can we develop a tool for the identification of historic and prehistoric tsunami deposits on the shelf? Can we detect predecessor events along the Algarve coast, and obtain information about timing, frequency and magnitude of these natural hazards?

The weather forecast is promising for the next days, especially for early November. We hope to retrieve a lot of cores at varying water depths.

Everybody on board sends greetings to those at home. All are ok and in good shape.

Klaus Reicherter, chief scientist