



SO233
Walvis II
Weekly Report No. 1
(14.05. – 18.05.2014)



R/V SONNE
32°50' S / 03°00' E

Despite the long journey from Germany, we arrived in Cape Town, South Africa without jet lag, since there is no time difference between the countries. After spending the night in a nice hotel, despite being a former prison, we were picked up at 8:00 a.m. by the ship's agent, taken through customs and then boarded the R/V Sonne, located a ten minute walk from the waterfront district. Since the laboratories were largely set up during the previous cruise, most of the scientific participants (composed of 16 Germans, 2 Namibians and 1 Russian) spent a gorgeous, sunny day in Cape Town. Many took the cable car up the famous Table Mountain to obtain spectacular views of the city and harbor and to see where the Indian and Atlantic Oceans meet, representing the transition from SO232 from the western Indian Ocean to SO233 to be carried out in the southern Atlantic Ocean. Unfortunately the next day we were greeted by stormy weather and rough seas and therefore started our journey on a bit of a rollercoaster ride with many of the scientists spending the first day in their bunks. By the second day, the clouds departed and sun shone again and slowly the sick scientists emerged one by one from their cabins. Already on the second day, everyone on board was smiling again.

The goal of the R/V SONNE 233 cruise is to carry out detailed bathymetric (the inverse of topographic, i.e. depth) mapping, sediment profiling, and sampling of the volcanic rocks, sediments and benthic biology of the Walvis Ridge. The Walvis Ridge forms the NE half of the c. 2,500 km long volcanic chain on the seafloor stretching from the coasts of Namibia and Angola southwest to the volcanically active Tristan da Cunha and Gough Island groups. The Tristan-Gough hotspot track is connected to the Etendeka flood basalts, representing a massive volcanic event that occurred ~132 million years ago, while Africa and South America still formed part of the Gondwana supercontinent, when all continents were connected. The Etendeka flood volcanic rocks together with the Parana flood volcanic rocks on the adjacent part of South America completely covered an area about 2000 km in diameter. This massive, but geologically short-lived, volcanic event is believed to have triggered the breaking apart of Africa and South America. The classic hotspot theory proposes that this was formed by a giant mushroom-shaped plume head that rose up from the lower mantle at depths of ~2800 km to the base of the Gondwana lithosphere, causing uplift and extension that initiated formation of the Southern Atlantic Ocean. After this giant mushroom-shaped plume head dissipated, a linear volcanic track formed above the cylindrical plume stem leading from the Etendeka flood volcanic rocks in Africa to the Tristan and Gough Islands. Although the Tristan-Gough hotspot track is considered to be a classical example of the evolution of mantle plume from birth to close to death at present, a well-developed age progression, expected by the hotspot hypothesis, has yet to be established. Recovering volcanic samples from the Walvis Ridge for age dating is therefore a major goal of the SO233 cruise. In addition, spatial and temporal variations in the geochemistry of the volcanic rocks recovered will be used to map out the geochemical domains in the lowermost mantle just above the earth's core.

The biology program aims at collecting benthic marine invertebrates from both hard rocks and sediments to determine the benthic biodiversity of the Walvis Ridge. Additionally, the Walvis Ridge separates the Angola Basin and the South African Basin and we are interested in testing potential connectivity between those basins by comparing meiofauna diversity in sediment cores from either side of the ridge. The hard bottom fauna uplifted with the dredged rocks will be preserved to study the distribution and potential dispersal ability of species along the ocean ridges.

Everyone on board is doing well and sends their greetings.

Kaj Hoernle (chief scientist SO233) and the cruise participants



View of Cape Town and Harbor from Table Top Mountain with view of Robben Island where Nelson Mandela spent most of his 27 years imprisonment (Jörg Geldmacher).



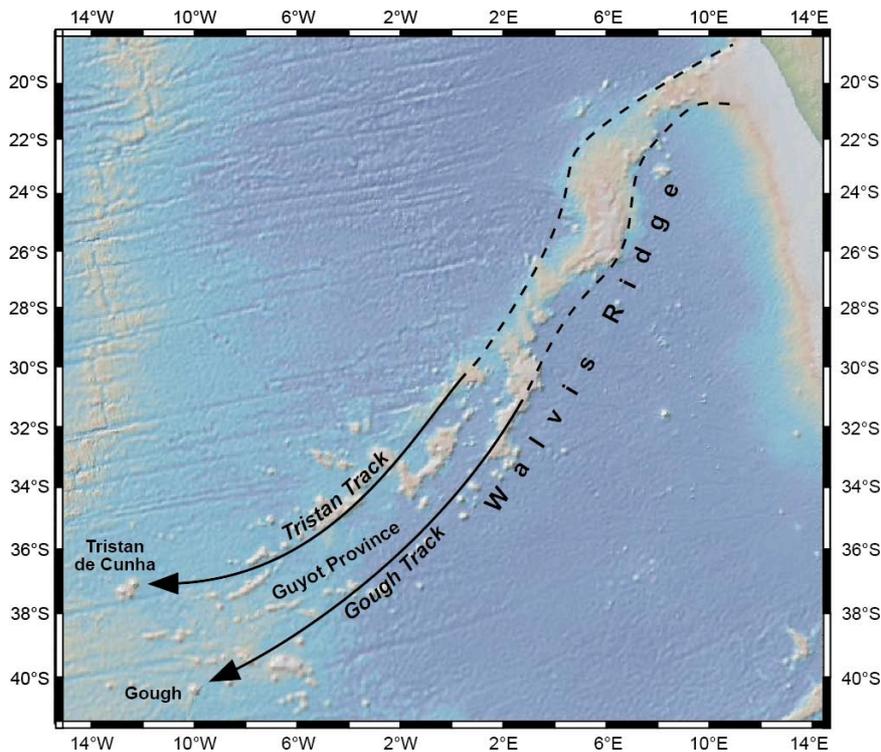
Table Top Mountain looking towards the junction between the Indian and Pacific Oceans (Jörg Geldmacher).



Cape Town Waterfront District with famous Table Top Mountain in the background (Kaj Hoernle).



The Sonne at dock in Cape Town only a 10 minute walk from the Waterfront District (Kaj Hoernle).



Map of Southern Atlantic showing Tristan-Gough hotspot track (based on GeoMapApplications)