



SACROSS

M133

(15.12.2016 – 13.01.2017)



3. weekly report 01. Jan. 2017

We made good progress along the east-west section. Up to now we have measured about 150 XBT profiles. XBT is the abbreviation for

„expendable bathy thermograph“, and refers to a one time use only probe. The XBT is launched into the ocean behind the driving ship.

The probe remains connected to the ship by means of two thin copper wires that transmit the temperature. The depth is determined by the time of flight.

The probe unwinds about 800m of wire as it passed through the ocean. XBT profiles used to be a great way to observe the upper ocean temperatures up to 500-800 m depths. Today the XBT programs has been superseded by the global Argo program with its 4000 profiling floats. XBTs are only used along a few select line



We wish you all a Happy New Year 2017!



XBT probe (front) and canister in the back.

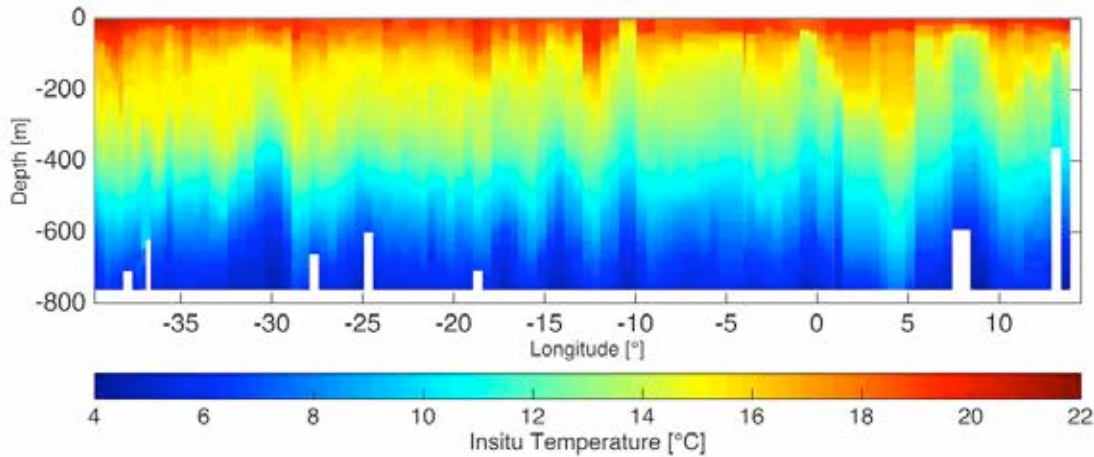
crossing ocean basins where the high resolutions provides new insight. We launch an XBT every 30nm and normally two U-CTD profiles between XBT stations. However the U-CTD only reaches down to 400m depths.

The XBT data are transmitted by e-mail to to two data centers. One in Miami (AOMLS) USA and the other is the Coriolis Center in Brest France. These centers use all data to improve the initial ocean conditions for

operational ocean information from ocean forecast models. The full resolution data are later used for scientific analysis of long term changes in the ocean and climate

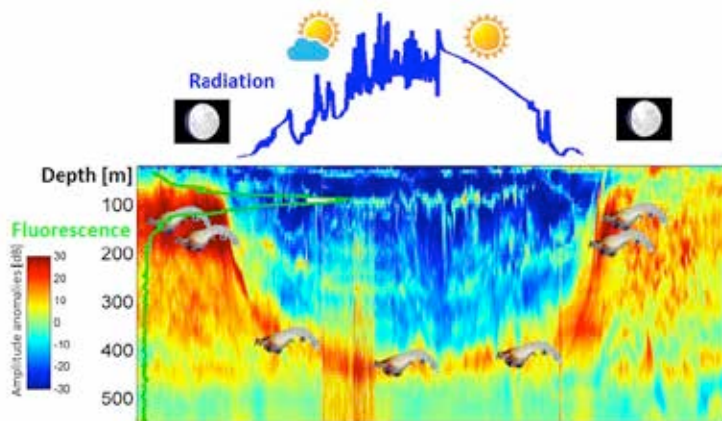


system. Together with the current data from the ship board ADCP also the northward upper ocean heat transport of the South Atlantic Ocean can be calculated.



XBT temperature observations along 34.5°S (Patrizia Handmann)

The continuous measurements of the ADCP system can also address different scientific questions. One of our students from Uruguay, Gaston Manta, is analyzing the acoustic target strength of the 75 kHz ADCP. The target strength is particularly large for krill. The target strength anomaly for each layer as a function of depth and time of days show clearly a pattern that is consistent with the daily migration of zoo plankton (such as krill). This vertical migration is determined by two factors. In the upper layers of the ocean the phytoplankton abundance is high. This layer is the preferred depth to feed. On the other hand during the day the light levels are so high, that predators



Diel evolution of acoustic target strength of the ADCP as a function of depths. The radiation of that day shown on the top and the vertical profile of fluorescence on the left. (Graphic from Gaston Manta).

such a small fish can easily detect the krill and hunt them. Thus the krill has learned to avoid the light and swim down in the deep darkness during the day.

We ask ourselves if the vertical migration behavior might also be a function of cloud cover? The data clearly show, that krill does not migrate shallower than 100m depths. From the fluorometer data we clearly detect a maximum in 100m depths. Clearly that is where most of the phytoplankton lives and thus the most attractive feeding layer.

The summer of the southern hemisphere is exhibiting mixed conditions. Some days we have seen strong winds and other days the warm sun shine is with us.

Last night we welcomed the New Year with a party and wish all of those who had to stay behind a Happy New Year 2017!

The mood on board is excellent, the food was amazing in particular during all the holidays. The collaboration with the captain and his crew remain outstanding.



Interesting sea creatures found in the MultiNet. A crab that lives in a Salp.

With best wishes from 34° South and 45° West,

Martin Visbeck and the Crew of the M133 expedition.

More information can be found in the blog:
<http://www.oceanblogs.org/mysciencecruise>