

Interactive comment on “Variability of water mass properties in the Strait of Sicily in summer period of 1998–2013” by A. Bonanno et al.

A. Bonanno et al.

francesco.placenti@iamc.cnr.it

Received and published: 3 June 2014

Probably we did not present our results in the best way, since also for the Anonymous Referee #2 the manuscript does not offer new results (“fresh insights or contributions to existing knowledge”). As it is proposed in the title of the submitted manuscript, our main aim is to examine the variability of thermohaline properties of the water masses flowing through the Strait of Sicily in summer during the period 1998–2013. The basic idea driving such study, supported by a 16 years long oceanographic dataset (3698 CTD casts) partly unpublished, is to integrate the previously acquired knowledge in a strategic area such as the Strait of Sicily. Using an excellent area coverage, we evaluated the inter-annual variability of surface and intermediate waters characteristics, and we tried to detect and recognize the main mesoscale phenomena present in the

C474

Strait of Sicily. The manuscript for the first time highlights the signature of WIW in the north-western part of the study area. The transitional waters between AW and LIW, in the westernmost Tunisian waters, are characterized by intermittent signatures (Sammari et al., 1999; Lermusiaux and Robinson, 2001) composed mainly of two main water masses, the Western Intermediate Water (WIW) and the Ionian Water (IW). The presence of WIW was observed in a Sicily-Tunisia transect also by Ismail et al. (2012), and it was located in the Tunisian side. Our data highlight the intermittent presence of WIW in the study area (12.235°E; 37.705°N), in more coastal stations and not in all the surveys, suggesting a spreading of WIW also in the western coastal waters of Sicily. Another topic we tried to discuss in the manuscript is the link between water masses characteristics and the BIOS (Gacic et al., 2010). In fact, we have shown possible links between the alternation of the surface circulation in the central Ionian Sea with the salinification phases (1998–2007) in the intermediate and deep waters in the study area.

The comments we received stressed the importance of reviewing the manuscript and to change it both in terms of general structure and formal aspects, for better emphasizing the new results in this very complex area of the CMED.

In the following our answers to the specific comments are reported:

1) We agree on the comment that “Abstract is very poor”. We would like to work on the Abstract section and submit a new version of the manuscript in order to better highlight in this part the new contributions to existing knowledge.

2) We agree also with the second comment/suggestion. So in the new version of the manuscript we would like to separate “results” and “discussion” in two different sections. Probably this will make the manuscript clearer.

3) In summer time the presence of WIW was observed only in the westernmost part of the study area (12.235°E; 37.705°N), in more coastal stations and not in all the surveys. Some CTD casts collected in coastal waters located in the north-western

C475

corner of Sicily (Tyrrhenian entrance) better show the WIW presence. We would like to add such profiles to the TS plot in order to better clarify the observed WIW layer. Moreover, the estimated characteristics of WIW in our study area are similar to the values reported by Ismail et al. (2012) in the Tunisia-Sicily transect between Cape Bon and Mazara del Vallo. We agree on the opportunity to make the tEMDW signature more evident adding a panel with an expanded view of the Theta-S plane around $38.5 <S < 38.8$. The presence of CIW is observed only in the easternmost part of the study area (Ionian sea) and the salinity profiles highlight both CIW and LIW signatures. Mixing processes occurring in the Sicilian Channel make undistinguishable these water layers within the Channel. The typical θ -S plot of offshore stations in the Strait of Sicily shows only profiles with one salinity maximum, which is likely associated to the intermediate water layer of eastern origin (or Eastern Intermediate Water according to Millot, 2013).

4) In tables 2 and 3 we prefer to give mean values and standard deviations with two significant digits since the rounding to only one digit could be a problem mainly for salinity values. We agree on the opportunity to add plots with the depths of Minimum and Maximum Salinities in Fig. 3 and eliminate Table 3.

5-10) We agree with the proposed suggestions and we will modify the manuscript accordingly.

11) In these sentences we intended that, in case of cyclonic circulation in the Ionian sea, less salty surface water may arrive in the Levantine basin in comparison to the years with anticyclonic circulation in the Ionian. Consequently, variability of salinity in the intermediate water in the Strait of Sicily could be explained in terms of the thermohaline variability in native LIW, as proposed also by Gacic et al. (2013). Probably such aspect was not clearly described in the manuscript. We will modify the text in order to better explain it.

12) Unfortunately CTD profile in the station 945 was not always collected until the maximum depth (bottom). Since 2003 the maximum depth was about 600 m. Probably

C476

it is better to show two panels with 1) data collected in the station 945 and 2) data from the station G605.

Interactive comment on Ocean Sci. Discuss., 11, 811, 2014.

C477