

The authors would like to thank the referee A. Mishonov for his constructive and detailed review, his remarks on technical corrections for the improvement of the manuscript and the positive comments about the importance of the Atlas for accessing regional climate change over the long time period.

Please see below is *our response (in italics)* and the *changes (in red)* following the **referee review and remarks for minor technical corrections (in bold)**.

Review by Referee #2

This ms is describing a very important step in developing of the comprehensive regional climatology for the Mediterranean Sea - a very important region of the world ocean. This climatology provide an improved oceanographic foundation and reference for multi-disciplinary studies with its high-resolution quality-controlled temperature and salinity fields on standard depth levels from the sea surface to 5,500 m depth. The individual decadal fields are a significant upgrade from the previous version of the Mediterranean Sea climatology. This could be quite useful for assessing regional climate change over the long time period and can be utilized in other climate-related applications. Using DIVA tools for data processing is interesting approach and it is appears to be quite successful. I will be very much interested to see how this Atlas will be used in climate change research in that region of the world ocean.

General comment to the referee review:

We would like to inform the referee that a direct output of the Atlas (and the subject of a second paper) is a set of climatic indices such as long time series of temperature, salinity, ocean heat/salt content anomalies, differences of spatial patterns of anomalies between decades etc for accessing the climate change regime of the Mediterranean basin.

Reviewer's remarks for minor technical corrections.

- 1. Page 4, Line 25 in 1.1 Objectives chapter: word 'fields' is missing in ' Seasonal climatological gridded obtained by analyzing ... ' sentence.**

Reply to the reviewer:

*In the revised manuscript, the word 'fields' will be added and the sentence will become:
"Seasonal climatological gridded **fields** obtained by analyzing all data of the whole period from 1950 to 2015 falling within each season."*

- 2. Page 4, Line 32 in 1.1 Objectives chapter: word 'obtained' is missing in ' Annual gridded fields by analyzing all ... ' sentence.**

Reply to the reviewer:

*In the revised manuscript, the word 'obtained' will be added and the sentence will become:
"Annual gridded fields **obtained** by analyzing all data regardless month or season for each of the 57 running decade from 1950–1959 to 2006–2015."*

3. Page 5, Part 2 Data, Line 21: correct INVG to INGV.

Reply to the reviewer:

In the revised manuscript INVG will be corrected to "INGV".

4. Page 6, Table 1 - remark 1: WOA13 listed as having 57 levels for all temporal resolutions. In WOA13 57 levels are only for monthly fields. Annual and seasonal fields made on 102 levels. - remark 2: WOA13 based on WOD13, which consist of data collected from following platforms: Ocean Station Data – OSD; High-resolution Conductivity-Temperature-Depth – CTD; Mechanical/Digital/Micro Bathythermograph – MBT; Expendable Bathythermograph – XBT; Surface – SUR; Autonomous Pinniped Bathythermograph – APB; Moored Buoy – MRB; Profiling Float – PFL; Drifting Buoy – DRB; Undulating Oceanographic Recorder – UOR; and Glider – GLD. - remark 3: WOA13 consist of several parameters, not only T & S: Temperature (°C) Salinity (unitless) Density (kg/m³) beta version Conductivity (S/m) Dissolved Oxygen (ml/l) Percent Oxygen Saturation (%) Apparent Oxygen Utilization (ml/l) Silicate (µmol/l) Phosphate (µmol/l) Nitrate (µmol/l) - remark 4: In addition to the listed Temporal resolution, WOA13 consist of several decadal climatologies (that is correctly stated in 1.1 Objectives chapter, lines 5-10).

Please correct info in Table (all correct information is presented on page 19, part 4.3, lines 6-11).

Reply to the reviewer:

The reviewer is right that there is missing information about WOA13 in Table1. The content of Table 1 was intended to describe the available climatologies in Mediterranean that would be compared with the new Atlas and in case of WOA13, the T,S climatology on 1/4° x 1/4° horizontal resolution, at 57 leveles, from 0-1500m, but this is not clearly stated neither in the Table 1 caption neither in the main text. In addition, in case of Medar/Medatlas there are mentioned additional than the T,S parameters.

Therefore, all the remarks will be addressed. Analytically:

Remark 1: in Table1, at the corresponding cell it will be added "57 levels for monthly fields, 102 levels for annual, seasonal fields."

Remark 2: in Table1, at the corresponding cell it will be added analytically all instruments/platforms names, e.g. "Ocean Station Data – OSD; High-resolution Conductivity-Temperature-Depth – CTD; Mechanical/Digital/Micro Bathythermograph – MBT; Expendable Bathythermograph – XBT; Surface – SUR; Autonomous Pinniped Bathythermograph – APB; Moored Buoy – MRB; Profiling Float – PFL; Drifting Buoy – DRB; Undulating Oceanographic Recorder – UOR; and Glider – GLD."

Remark 3: In addition to Temperature (°C) and Salinity (unitless) all the rest climatologies will be added in Table 1 e.g "Density (kg/m³) beta version Conductivity (S/m) Dissolved Oxygen (ml/l) Percent Oxygen Saturation (%) Apparent Oxygen Utilization (ml/l) Silicate (µmol/l) Phosphate (µmol/l) Nitrate (µmol/l)."

Remark 4: in the temporal resolution of WOA13 the decadal climatologies it will be added as: "Climatic, monthly, seasonal, averaged periods, decadal (1955-64, 1965-74, 1975-84, 1985-94, 1995-2004, 2005-2012 years)."

5. Page 7, Figure 1 - could be made bigger.

Reply to the reviewer:

Figure 1 is of high resolution and allows the modification of size. In the revised manuscript Figure 1 will be enlarged to the page width.

6. Page 11, Part 3.1 The Diva ..., Line 11: replace 'filed' with 'field' in '..a continuous filed approximating...'

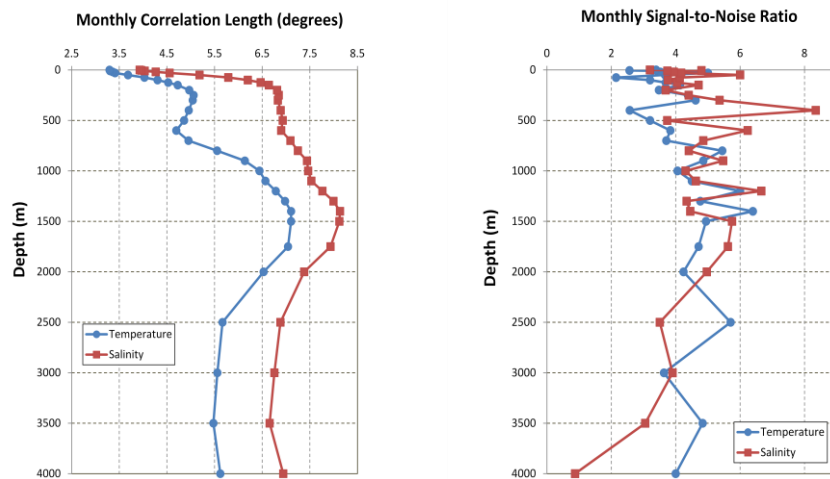
Reply to the reviewer:

In the revised manuscript the "filed" will be replace with "field".

7. Page 13, Fig. 3: would be good to have a titles/units for X&Y-axis.

Reply to the reviewer:

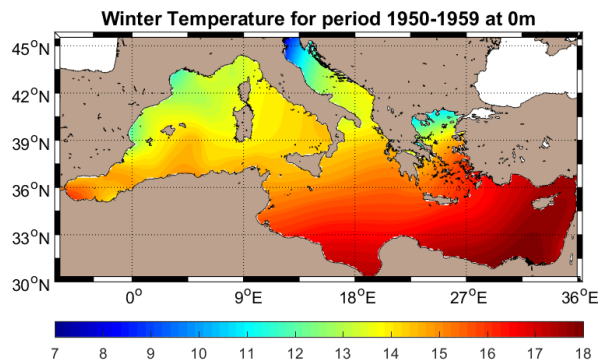
In the revised manuscript the titles/units for X&Y will be added as in the figure below ("Depth (m) for Y axis", "Monthly-Seasonal Correlation Length (degrees)", and "Monthly-Seasonal Signal-to-Noise Ratio").



8. Page 16, Fig. 4: I would suggest to keep the T range for (b) plot similar to (c), & (d) plots.

Reply to the reviewer:

In the revised manuscript the following image with the corrected T range will replace Figure 4b:



9. Page 17, Fig. 5: I would suggest to keep the same T range for a-d plots (let say 6-28C), so they will be visually comparable (as it is done for S on Figs 6, 7, & 8).

Reply to the reviewer:

The temperature seasonal cycle is more marked than the salinity's with high differences between winter and summer (mean shift about 9°C). The T range was intentionally changed from one month to another because the focus was not to show the seasonal cycle but the T gradients from north to south and from east to west. However, as this is not explicitly explained in the manuscript the reviewer's suggestion is correct and for consistency reasons with the other figures, *the T range will change and be kept constant as below to allow the visual comparison:*

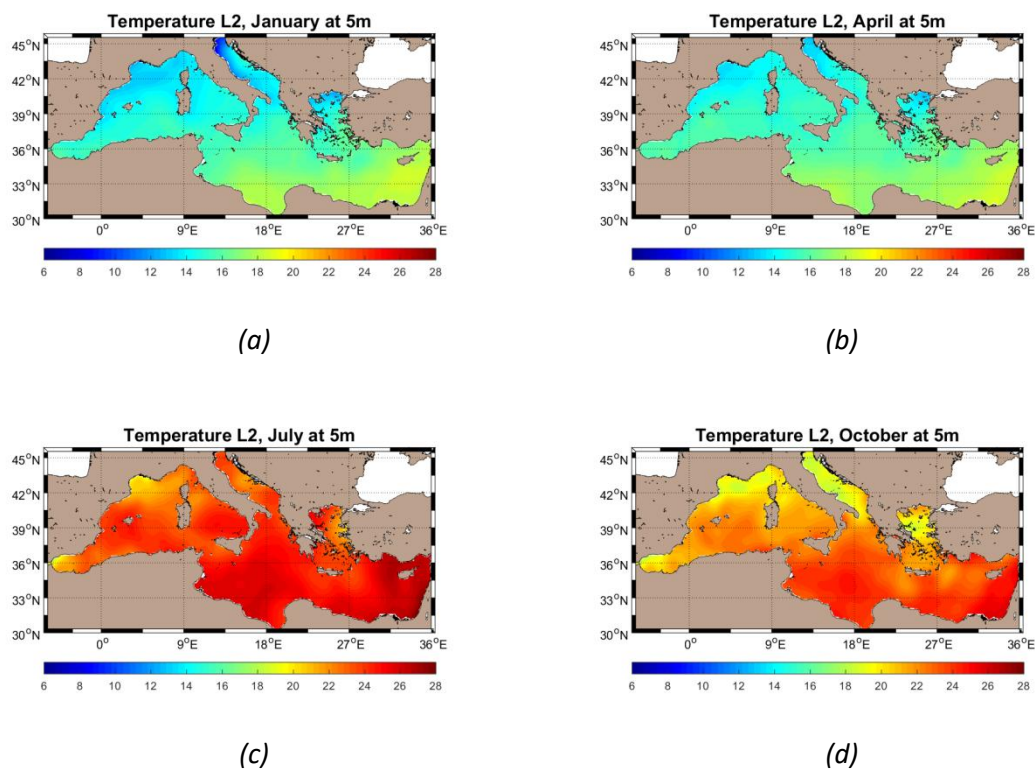


Figure 5: Surface temperature climatology at 5 m in (a) January, (b) April, (c) July, and (d) October.

10. Page 25, Fig. 13: top-aligning the a-b & c-d plots will improve the appearance of this figure.

Reply to the reviewer:

In the revised manuscript the vertical alignment of a-b-c-d plots will be set to top.