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Interactive comment on "A near-surface sea temperature time series from Trieste, north Adriatic Sea (1899–2015)" *by* Fabio Raicich and Renato R. Colucci

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Pages and lines of the edited manuscript, unless otherwise stated (To make reading easier, the pdf version of this document and of the edited article, with revisions, are attached as supplement2.zip.)

It seems that the paper could gain in relevance if two points would be added. I. There is no comparison with the trend of (surface) sea temperatures of either coastal, nor 'global' ocean sea surface temperature data. This 'global warming trend' is a hot topic, relevant nowadays. Authors confined themselves mostly to the methodology of 'combining' the data of different measurements techniques, of different sea temper-

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Discussion paper

ature ‘sampling’, on elaborating the time series (filtering the data) and on the trend of sea temperature rise that they reveal from those data. There are certainly many research papers that describe centennially temperature trends elsewhere. Moreover, there are reports of IPCC (although quality reports are lately blurred with reports of IPCC meetings. . .) that still somehow ‘matter’, e.g. the IPCC Report ‘Global warming of 1.5°C’, in Chapter 1: [Allen, M.R., et al., 2018: Framing and Context. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, et al. (eds.)]. In Press.]. There one may find a few ‘useful sentences’ already at the beginning, e.g.: ‘Human-induced warming reached approximately 1°C (likely between 0.8°C and 1.2°C) above pre-industrial levels in 2017, increasing at 0.2°C (likely between 0.1°C and 0.3°C) per decade (high confidence)’, and also ‘Accordingly, warming from preindustrial levels to the decade 2006–2015 is assessed to be 0.87°C 2 (likely between 0.75°C and 0.99°C).’ These sentences are just very modest examples about how the result (the temperature trend in the ‘intestines’ of the central middle Europe, facing the sea) of authors makes sense and is ‘in line’ with the trends others have found. There are also differences (e.g. in the trend within last 30 years) with other findings, which would well be described in Discussion. In the Introduction, though, the relevance of this particular, long time series has to be emphasized and compared with other very long term studies. II. The second topic for which it seems just to be linked to the paper, is the matter of the sea-level rise. A brief look on publications of authors clearly shows that at least one of them has a solid reputation in ’knowing this matter well’. Authors may relatively easily combine their sea temperature rise finding with the sea level rise simply due to steric effect – they can estimate it and may also estimate the error of the estimation (they showed how nicely they know how to estimate errors. . .) of sea level rise due to temperature expansion of water (e.g. the effect of salinity (variability)). There is quite a large number of papers over the Adriatic and the Mediterranean

Sea that handle separately the sea level rise and the temperature rise, but only a few link these two trends. This is a good chance 'to do it right'! Answer (to both I and II): We did not extend the paper because in the journal's website (www.earth-system-science-data.net/about/aims_and_scope.html) it is written that "Any interpretation of data is outside the scope of regular articles.". The comparison of the trends obtained for different locations and from the global ocean requires data interpretation. The connection of sea-temperature rise with sea-level rise is a subject deserving a paper on its own. That is why we did not include in the article anything but the data description and the time series homogenization. We think that the text should not be extended the include the reviewer's suggestions.

Specific comments

Page, 1. Line 16: is the text in this line in 'bold'? A: This question is unclear. However, from the pdf version it does not seem so.

Page 3, line 24: Fig. 3 is referred. Should it be the Fig. 2? There was no Fig. 2 before in the text and it looks from Figure and figure caption of Fig. 2 that this should be Fig. 2. A: We are sorry for the mistake. Figures 2 and 3 at the end of the manuscript were swapped and identified by the wrong number. The mistake was corrected. (Pages 12-13)

Page 5, line 13: T0(h,d,m,y,z) →T0(h,d,m,y,z) A: This remark is unclear.

Page 5, line 18: '. . .between 13 and 17 values of T0.' Could it be added 'out of (?) 24 × 365.25' on average per year? A: In equation 1 it is clearly written that Tc(h,d,m,z) is the ratio of two sums over y from 1999 to 2015, i.e. 17 elements, while '24 x 365.25' is the average number of hours per year, which is not involved. The text was not modified as it seems clear enough.

Page 5, expression (3): In the expression (2) T24c is written down. However, it somehow follows from the expression (3) and the comment below it that T24c should be

expressed as the average of N values od Tc the number of available observations on the relevant day, and not the average of '24' values (expression (2)). Correct? A: No. The text at page 5, lines 11-12 reads "obtained by averaging hourly (0-23) temperatures and mean daily temperatures of days when all the 24 hourly observations were available". Therefore, 24 values are always available for the average.

Page 6, expression (5): It looks OK. . . A: This remark is very unclear.

Page 7, line 9: 'observational error σ0=0.18 °C, we obtain σc=0.05 °C and σ24c=0.01 °C' →ïĂäobservational error σ0=0.18 °C, we obtain σc=0.05 °C and σ24c=0.01 °C. A: If we understand it correctly, the reviewer suggests to remove italics for numbers. It has been corrected. (Page 7, line 20)

Page 7, line 23: '. . .was increased by 0.5 °C, as discussed above.'. Do authors refer to the line 18 in which ΔT = 0.5 $\pm$ 0.5 °C is written? If so, then they could write this more clearly and on line 18: ΔT = 0.5 $\pm$ 0.5 °C →ïĂäïČĎT = 0.5 $\pm$ 0.5 °C. The same for another ΔTin the same line. A: In order to avoid confusion, we modified the sentence as follows: ". . . increased by 0.5 °C on the basis of the above-mentioned temperature difference." Also in this case we removed italics from numbers. (Page 7, lines 29-30)

Page 7, line 27: there is a redundant copy of the sentence about Figure 4 from the line 25. . .. A: The repeated text was removed. (Page 8, line 12)

Please also note the supplement to this comment:
https://www.earth-syst-sci-data-discuss.net/essd-2019-15/essd-2019-15-AC2-supplement.zip

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