

Interactive comment on “Construction of surface air temperature series of Qingdao in China for the period 1899 to 2014” by Yan Li et al.

Anonymous Referee #2

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Reply to referees:

We appreciate the comments. And thanks a lot to the referee’s works which have greatly improved our manuscript. The followed text is our point-by-point reply. The words with blue colour are **comments from referee**. The words with **black colour** are the author’s response.

Specific comments:

1. Line 85 (Table 1): Are the given times local times within the time zone or true local times (i.e. additionally take the longitude of the station into account? Given that Qingdao was a German colony, it appears straightforward to assume that the "Anleitung zur Anstellung und Berechnung meteorologischer Beobachtungen" (van Bebber, 1904) or a similar official publication was used as reference. These manuals state that hourly observations must be taken on the hour, but three times daily ("climate") observations must be taken at true local time, which depends on longitude. Given the fact that there are several different "climate" observation times (7-14-21, 8-14-22, etc.) and given the fact that true local time may differ almost one hour from zone time (if the station is on the western edge of the reference longitude "belt"), it is important to know when these observations were taken. To my knowledge, Beijing local time was used in all of China prior to 1913, but it appears plausible that the colony rather followed what today is UTC+8 (in which case the time difference would be negligible, since Qingdao is almost on 120 E). So, if at all possible, the authors should constrain the actual time used in these observations.

Thank you for your careful review. Unfortunately we can find in the original hand written observation books as well as in “Deutsche Ueberseeische Beobachtungen”

(German observations in overseas) only “7a, 2p, 7p” and no information on whether it is “true local time” or “time zone”. The hourly data are taken from self-recording instruments and we think that a daily mean of 24 values should be always the same, independent from the minutes before or after the full hour. In order to find out what the local time mean, we look through several historical handwritten journals. Results show that at the end of 19 century, China’s coastal ports began to use Greenwich Standard Time, that is, the local time of 120° E as the standard time, and called “coast time”. The coast time facilitated navigation and trade in colony period of China. At present, China uses Beijing time, that is, the time zone of the East eight area as the standard time. Qingdao is almost on 120° E. Thus, the time difference would be negligible between the colony period and present.

2. Lines 150/151: These are heights above sea level, I assume? Is any information available where the thermometers were situated with respect to the ground?



Abb. 1.1: Historische Karte von der Umgebung von Tsingtau im Jahr 1912

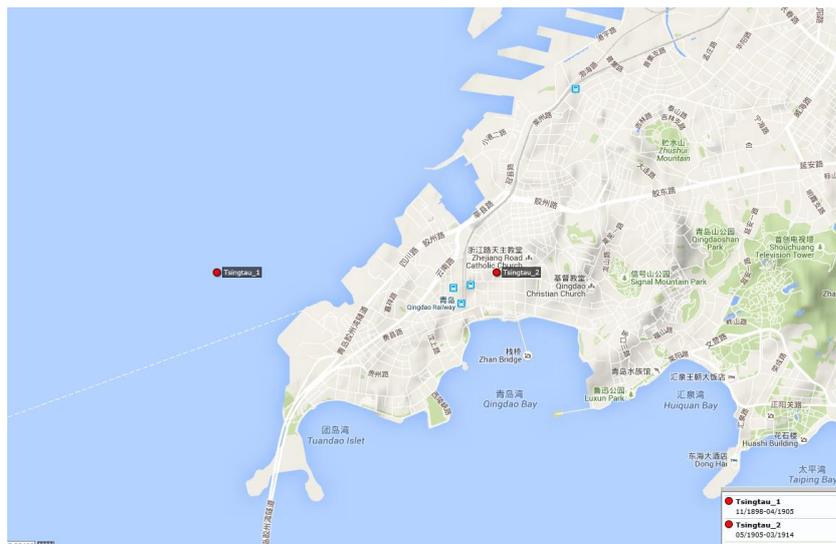


Abb. 1.2: Geographische Position der verschiedenen Standorte der Klimastation laut der damaligen ermittelten geographischen Koordinaten, Karte: Google Maps

In the earlier time from Jan 1899 to Apr 1905, SAT was observed at $36^{\circ}04' ; 120^{\circ}17'$; which was a harbor near the coast of Qingdao (Figure 2). From May 1905 to Mar 1914, SAT was observed at $36^{\circ}04' ; 120^{\circ}19'$; which was a small hill. The meteorology station was located at the top of this hill, without the effect of buildings and forest (Figure 1 and 2)

3. Lines 248/249: Wouldn't the most straightforward explanation for the "hiatus" be the increasing amounts of aerosols in the atmosphere? So I suggest to reformulate this paragraph.

The sentences in L248-249 are modified as follows in the revised paper:

The Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC AR5) pointed out that during the recent years (1998-2013), the global warming rate has slowed down. This period has been discussed in a number of papers (Kosaka and Xie; Smith) and has known as "hiatus" (Fyfe et al.) or "global slowdown" (Guemas et al). Recent studies indicate that the recent "warming hiatus" is also found in Chinese SAT changes (J Wang et al., 2014; Li Q X et al., 2015). Proposed mechanisms for the

recent warming hiatus at the global scale are still under debate, including changes in deep-ocean heat uptake, anthropogenic aerosols, solar variations, volcanoes, and sea surface temperature (Meehl et al., 2011; Kaufmann et al., 2011; Kosaka and Xie, 2013). At regional and local scales, other factors may also play a significant role, which makes attribution challenging.

4. Lines 267-269: Discussing wavelets with time scales of 80 years in a 100 year time series is rather close to overinterpretation.

We delete the sentence “A wavelet analysis (figure omitted) suggests dominant and persistent variations with time scales of about 40-80 years which is consistent with results of other studies (Weng 2005, Wang and Zhang 2011).”

5. There are a number of typos I would like the authors to correct. Also, there are a number of less than optimal formulations. For example: Line 18: Excel

We modify “excel” into “Excel” in the revision.

6. Lines 18-21: Something is missing in this sentence.

The data is provided and archived by Deutscher Wetterdienst (DWD) web page under overseas stations of the Deutsche Seewarte (http://www.dwd.de/EN/ourservices/overseas_stations/ueberseedoku/doi_qingdao.htm) in the form of ASCII. Users also can freely obtain the data at https://dx.doi.org/10.5676/DWD/Qing_v1.

7. Line 60: Delete "there are".

We delete the two words “there are”

8. Line 61: Add question mark after the question.

We add the question mark at the end of each question.

9. Line 68: "...the archive of the..."

We modify "archive" into "the archive of the".

10. Line 138: "...are not efficient..."

We modify "is not efficient" into "are not efficient".

11. Lines 310-314: I am aware of the restrictions of 20CR, but is one newly constructed time series really enough to state that there is a problem with 20CR?

Thank you for your reminding. In our work, the monthly mean SAT data of the 20CR with a horizontal resolution of 2 °in both longitude and latitude are interpolated to the locations of meteorological stations to compare with the newly constructed long-term SAT series. To be honest, there are some uncertainties in the processes of interpolation and gridding, considering that the horizontal resolution is much low. We agree with you that just one newly constructed time series really enough to state that there is a problem with 20CR. So we delete this paragraph in the revision paper.