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Comment on os-2022-2

Paul Barker (Referee)

Referee comment on "Technical note: TEOS-10 Excel – implementation of the Thermodynamic Equation Of Seawater – 2010 in Excel" by Carlos Gil Martins and Jaimie Cross, Ocean Sci. Discuss., <https://doi.org/10.5194/os-2022-2-RC1>, 2022

Review of "Technical note: TEOS-10 EXCEL – Implementation of the Thermodynamic Equation Of Seawater – 2010 in EXCEL" by Carlos Gil Martins and Jaimie Cross.

This technical note describes the implementation of TEOS-10 software in Excel. Most of the software implemented is from the GSW toolbox (McDougall and Barker, 2011), however the authors opted to adopt their own version of interpolation to compute the Absolute Sallinity Anomaly Ratio that is used in the calulation of Absolute Salinity.

The note is well written and contains sufficient detail to inform the reader what it contains and how to use the software.

General point

Note that the correct capitalisation is Absolute Salinity, Practical Salinity, Reference Salinity and Conservative Temperature.

Detailed points.

Line 46

Delete "If"

Line 54

The subscript P in S_P should not be italic.

Line 60 (also applies to line 11)

The estimation of Absolute Salinity in the GSW is done through a look-up table but it can be measured directly with the aid of a densimeter.

Line 61

TEOS10 for excel is included in Jiang et al (2022).

I am not sure if the authors are aware that there is a Visual Basic version of Seawater-Ice-Air (SIA) library which includes some of the GSW functions. The SIA software is available from <http://www.teos-10.org/software.htm#2>

Lines 114– 115

The temperature acronym for temperature 68 appears as ITS-68 it should be IPTS-68.

Line 130

If the data is not in the ocean then the Absolute Salinity value returned should be equal to the Reference Salinity, then the other values can be computed.

Section 2.4 SA-CT diagram

Looking at the code, I think the sigma contour that is being plotted is sigma0. Section 3.10 confirms this, σ_0 is generally the standard notation for sigma0.

Section 3.1 SP_from_C

It would be great to include the low salinity (0 -2) extension to this function that is included in the GSW version of this software.

Section 3.3.1 Interpolation

Do you ensure that no interpolation occurs for the grids the span the Pacific Ocean and the Gulf of Mexico, across the Panama Canal?

Section 3.3.2

It would have been great if you let the McDougall and Barker know about the missing values in the lookup table. I know that they would be eager to correct this.

References

Jiang L-Q, Pierrot D, Wanninkhof R, Feely RA, Tilbrook B, Alin S, Barbero L, Byrne RH, Carter BR, Dickson AG, Gattuso J-P, Greeley D, Hoppema M, Humphreys MP, Karstensen J, Lange N, Lauvset SK, Lewis ER, Olsen A, Pérez FF, Sabine C, Sharp JD, Tanhua T, Trull TW, Velo A, Allegra AJ, Barker P, Burger E, Cai W-J, Chen C-TA, Cross J, Garcia H, Hernandez-Ayon JM, Hu X, Kozyr A, Langdon C, Lee K, Salisbury J, Wang ZA and Xue L (2022) Best Practice Data Standards for Discrete Chemical Oceanographic Observations. *Front. Mar. Sci.* 8:705638. doi: 10.3389/fmars.2021.705638

McDougall, T.J. and Barker, P.M. (2011) Getting started with TEOS-10 and the Gibbs Seawater (GSW) Oceanographic Toolbox, 28pp., SCOR/IAPSO WG127, ISBN 978-0-646-55621-5,

