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Interactive comment on "About uncertainties in practical salinity calculations" *by* M. Le Menn

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At first, I would like to thank you for your agreeable comments and the interest you have fell to this document.

Explanation about the correlation coefficient in equation (5):

r(G,Gst) can be chosen to be equal to 1, because measurements of G and Gst are made with the same cell. As explained lines 22-23 page 4, G and Gst depend on the cell temperature. In the case of a temperature drift of the cell between the moment of the calibration with the SSW and the moment of the measurement of the sample which conductivity is G (this is often the case), values of G and Gst depend on this drift. They are, then, strongly correlated. r(G,Gst) could be <1, but I take deliberately the worst case. The result of the calculation in equation (6), (1-G/Gst), describes enough well the performance of the salinometer: if G = Gst, the first term of equation (6) disappears

and the uncertainty on Rt is lower. The uncertainty increases if G > Gst or G < Gst. The choice of r(G,Gst) value could be discussed in the case when measurements were made in stationary conditions, that is to say, with long term stable conditions. In this case r(G,Gst) would be close to 0. But, a Monte Carlo simulation with r(G,Gst) = 0 shows that values of uc(Rt) are quite similar and values of Us are the same because the other sources of uncertainty dominate the expanded uncertainty on salinity Us (relation 14). Then, I propose to replace the sentence 'To simplify the calculation without to loose a lot of its accuracy, we can take...', by:

'In the case of a temperature drift of the cell between the moment of the calibration with the SSW and the moment of the measurement of the sample (this is often the case), values of G and Gst depend on this drift. They are, then, strongly correlated. r(G,Gst) can be inferior to 1, but let's take deliberately the worst case where r(G,Gst)= 1.'.

Explanation about the rectangular pdf of u(sb):

The only available information on the drift of standard salinity bottles concerns the maximum value of this drift (0.001) on 96 days. According the principle of the maximum of entropy of information, applied in the GUM to retrieve the pdf of quantities by B type method, only a rectangular pdf can be attributed to u(sb). If the number of days between the fabrication and the opening of the bottle was known, the user of this relation could multiply 0.001 by a coefficient proportional to the number of days. But, in the general case, this information is not available and it is correct to divide 0.001 by the root of 3.

The manuscript will be read and corrected by a professionnal French-English translator, before to be submitted again to publication.

Interactive comment on Ocean Sci. Discuss., 6, 2461, 2009.