

Reply on RC1

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Referee comment on "Reanalyses of Maskelyne's tidal data at St. Helena in 1761" by Philip L. Woodworth and John M. Vassie, Earth Syst. Sci. Data Discuss.,
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This new dataset is undoubtedly of great interest especially in the recent context where ocean tide evolution at the coast but also globally is in discussion in the ocean tidal community. Datasets back to the eighteenth century is very rare especially in the Southern Hemisphere making the release of this new old-dataset even more valuable. The sea level data are analysed using 3 different methods which gives confidence on the robustness of the main conclusion of no significant semi-diurnal tide evolution during the past 2 and a half century. This paper also offers nice recipes to help the tidal scientist to process their old short-term datasets using these different methods. Although I mainly agree with the way the data is processed I have some questions listed below :

(1)The dataset used to estimate the modern tidal constituents (TC), is the sub-surface pressure (SSP) recorded at Saint-Helena between oct-1995 and oct-1996. There is a more recent dataset at the same location, with direct observations of sea level from a radar made between jan-2011 and feb-2013. This dataset is available at University of Hawaii Sea Level Center (as the one used by the authors from 95-96). What drives the choice of analysing the SSP dataset instead of the more recent one ? The recent radar data gives at the mm level the same values as the (S2,S1) modified TC used by the authors without the need to modified S1 and S2.

(2) In the second approach, they interpolate the Maskelyne data at 1 minute using a tidal prediction. As they authors quoted themselves, there is a clear danger about this method due to a leak of information from the prediction to the observation. Anyway, to make the tidal prediction they use the TC obtained with another dataset (called STHL2 obtained from SSP between Nov-1993 do Feb-1995). As they quote the STHL2 TC is very close to STHL4.X. I don't understand the reason behind using another set of TC for this second approach ? Using the prediction from the STHL4.X would have give almost the same results no ?

(3) The standard deviation of the 478 historical data (28.41 cm) is higher than in any of

the recent 2 months period available (from 1995 to 2013 where maximum value is 27.1 cm and the mean standard deviation of every 2 months period is close to 25.5 cm). Does the authors have any explanation of this slightly larger standard deviation. Can it comes from the sampling of the Maskelyne data ? Can it be a slight scale error on the tide staff build by Maskelyne or a small difference in the conversion between inch (used by Maskelyne) and meter (change in definition between 1761 and the official conversion).

Minor comments :

I recommend to add in the text or in a separate table the list of constituents used in the tidal prediction (for the STHL2 and STHL4.X), this will allow the futur users of the Maskelyne dataset to reproduce the results of this paper or at least to test their own harmonic analysis code.

A typo has been found in the Maskelyne data file provided by the authors on line 121 (date 1761-11-16 6:44 PM) a decimal '.' is missing, one should read 11.3 instead of 11 3. This is confirmed in the original Maskelyne report.