

Interactive comment on “Long-term variability of storm surge frequency in the Venice Lagoon: an update thanks to eighteenth century sea level observations” by F. Raicich

P.L. Woodworth (Referee)

plw@noc.ac.uk

Received and published: 16 December 2014

16 December 2014

Comments on 'Long-term variability of storm surge frequency in the Venice Lagoon: an update thanks to eighteenth century sea level observations' by F. Raicich (NHES)

This paper uses 18th century measurements of high and low waters in the Venice Lagoon, preserved in archives, to assess whether storm surges were more frequent and intense in the 18th century than later, and thereby whether the local climate at the time was different to today.

C2737

It is a nice piece of work and should be published with only minor suggested changes below. It complements similar work in sea level 'data archaeology' back to the 18th century, mostly in NW Europe and N America. It is very readable and the figures are fine

Many of my comments below are trivial ones.

7466, 23 - associated with

26 - ... Adriatic can result in a north-easterly ..

7467, 12 - middle of the Lagoon

7468, 4 - discussion of storm surge frequency and interannual variability of monthly means of sea level. Concluding remarks ..

7468, section 2.1 - if I understand right it would be worth having a sentence saying these Venice numbers are only one overall flux and one reflux number per day and not two as for Chioggia and as one would expect for a semidiurnal tidal location. (This brings into question whether the measurements were really made over 24 hours or only in daytime.)

7469, 2 - is 'segment' the right word? Chiseling?

7469, 11 - like the comment above, the word 'daily' is used which implies one number a day but I think in this case there are two, as shown in Figure 2. It would be good to make that clear.

7470, 10 - what about more recent air pressure data that must have been used in the inverse barometer calculations lower down?

around line 20 - it is a feature of many historical high and low water records like this (e.g. Liverpool and London) that it is not clear how the times were measured. Measuring heights is relatively easy because of the 'flat top' of the tidal curve but that makes measuring times uncertain. No doubt in some places the reversal of flows was used

C2738

for the time, rather than changes in the heights themselves.

22 - I would say 'Times at Chioggia' to make it clear.

7470, 23 - surely it is not just a question of applying a longitude correction. The times in the Chioggia archives must have been in apparent time and not a local mean time, so an equation-of-time correction is needed. The fact that the times start after sunset (7469, 21) makes it messier. Anyway, I gather that the times are not used in detail, although they must have been used for Figure 2 for example.

7471, 6 - I would mention that the storm clearly lasts for a couple of days.

8 - .. changes that have occurred ..

11-14 - this sentence relates to my comments above. The sentence will be more understandable if the information on whether one number or two a day is archived at Venice and Chioggia is given. I would also drop 'normally'.

21 - standard errors (STDs).

29 - I would add that these small errors are quite tolerable for the study of storm surges.

7473, top - this text is under-selling itself. A point that should be made here about the inverse barometer test is that if either of the sea level or barometer data were poor than you wouldn't get any correlation or reasonable regression factor at all. In fact both must be reasonable quality.

7474, 13 - 'secular means'? You mean the long-term average means?

7475, 15 - Temanza's

16 - By contrast, the Temanza ..

19 - in the Venice time series

28 - seem to report

C2739

7476,5 - homogeneously

6 - in the 18th century

7476, 21 - could you say again briefly why these values have these average values?

7478, 9 - containing the Venice sea level data.

I wondered at the end if you could give some references to other work e.g local work on storminess from data archaeology of met records (e.g. Padua). How does that relate to the storminess inferred from the sea levels? Also to the work in N America etc. But I do not feel strongly about this.

7483, Figure 3 - why doesn't the event in 1792 that you have in Figure 2 appear in Figure 3(a)? There is a spike in what looks like 1782.

7485, line 2 - indicates no data.

There are also many sentences that are too long and could be split e.g.

7466, 25 - .. uniformly. However ..

7467, 16 - ... engineering). Therefore, ..

7474, 5 - ... 1999). Therefore, ..

7475, 27 - .. expected. However, ...

7476, 6 - cautiously. However, ..

7477, 5 - .. means. Nevertheless, ..

7477, 7 - scarcity. However, ..

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 7465, 2014.

C2740