Hydrol. Earth Syst. Sci. Discuss., 10, C3792–C3795, 2013
www.hydrol-earth-syst-sci-discuss.net/10/C3792/2013/

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Historic maps as a data source for socio-hydrology: a case study of the Lake Balaton wetland system, Hungary" *by* A. Zlinszky and G. Timár

P. Paron (Referee)

p.paron@unesco-ihe.org

Received and published: 4 August 2013

The paper by Zlinszky and Timár is a timely, well written, well documented contribution that will be a reference for some time to come. This paper is at the boundary of several disciplines showing a degree of master of all of them. It also represent a review paper, it provides new data and insights in the study area knowledge, and it can serve as a teaching guide for socio-paleo-hydrological GIS research.

The paper brings up -in a very well written style- the importance of accessing historical maps and reports for the inclusion of pre-instrumental observations in hydrological

and geomorphological research. The authors describe this uses with an exceptionally accurate case of the Lake Balaton in Hungary and they are able to reach new, very important, conclusions on the wetland dynamics in history, providing new solid evidences of the causes.

The paper is well written and balanced. Nevertheless I would suggest to update the references and concepts of dating pleohydrological records presented in lines 6 to 22 of page 5 under section 1.2.2. As indicated in the attached pdf, some recent advances in the use of fallout radionuclide and OSL methods, allow dating of yearly processes in some conditions. See for instance the works of Appelby (2008) for the use of 210Pb, or Wallinga (2002) for the advances in OSL, and Hobo et al (2010) for a multidisciplinary way of dating floodplain deposits up to very recent events; of course the pioneering work of Walling et al (various years) on the use of 137Cs for dating very recent to single sedimentation events is also a relevant input to plaeohydrology, although recently it has been contested by Parson (2012).

Section 1.4 'The use of historic map for hydrology: State of the art' would benefit from adding a detailed description of the implications of scale in using historical maps. This issue is addressed by the authors in the second half of the paper (section 5.2.2) but I believe it should be brought forward to this point, being a crucial initial consideration in the choice of historical maps to use. In particular it has to be pointed out that a map is always (even in present times) a symbolic representation of reality at a given point in time and at a given scale. The scale of a map plays a crucial role in determining its possible use for quantitative applications. In a map at scale of 1:50,000 for instance 1 mm on the map equals 50 metres on the ground in the centre of the map, and this could be accepted, if this 'positional error' is within the 'standard deviation' of the measured natural phenomena. On the other hand historical maps (older than 100 years old) very rarely (basically only in few European countries) had such a detailed scale. Most frequently outside Europe they were in the scale of 1:100,000 or 1:250,000 or smaller. At these scales 1 mm on the map equals 100 metres or 250 metres (or more, if smaller

HESSD

10, C3792–C3795, 2013

scale) and usually this is far beyond the 'standard deviation' of the measure that we want to take on river channel planform changes or lake shrinking or expansion. In many cases historical maps were accurate but also highly interpolated with very sparse accurate measurement . We do not know the errors implied in the interpolation used: often the contour lines were interpolated manually between two measured spot height.

So in most cases the use of historic maps can be extremely valuable for determining the semi-quantitative evolutionary trends of a wetland (in its broader sense) and in the human land occupation styles. In much fewer cases they can be used for quantitative, spatially correct analysis.

The authors of this paper are well aware of this limitation (as they explain later in section 5.2.2) and in fact they use a unique treasure in world cartographic history, that is the 1:28,800 scale Austrian Empire geodetic topographic map. Where else in the world does it exist a more than two centuries old map at such a large scale and with such a wide coverage and accuracy?

I believe that for completeness of analysis the issue of scale should be described more in detail in section 1.4.4.

In the paper all the reference cited in brackets need to be spaced but I believe this was a problem arising from the conversion in pdf format so easy to correct.

Congratulations for the authors for their very well written paper.

Best Regards, Paolo

PS: in attachment the pdf file with comments (basically the same as reported here plus some typo)

References Appelby, P.G., 2008. Three decades of dating recent sediments by fallout radionuclides: a review. The Holocene, 18(1):83-93

Wallinga, J., 2002.Optically stimulated luminescence dating of fluvial deposits: a re-

HESSD

10, C3792–C3795, 2013

view. Boreas, 31(4): 303-322

Hobo, N., Makaske, B., Middlekoop, H., Wallinga, J., 2010. Reconstruction of floodplain sedimentation rates: a combination of methods to optimize estimates. ESPL, 35(13): 1499-1515

Parson, A.J., 2012. How useful are catchment sediment budgets?. Progress in Physical Geography, 36(1): 60-71.

Golosov, V., Belyaev, V. and Walling, D.E. (Eds.), 2004. Sediment Transfer through the Fluvial System. IAHS Publication no.283. 238 pp.

Williams, N. D., Walling, D.E. and Leeks, G.J.L. (2007) High temporal resolution in situ measurement of the effective particle size characteristics of fluvial suspended sediment . Water Research 41 (5), 1081-1093.

Walling, D.E. (2005) Tracing suspended sediment sources in catchments and river systems. The Science of the Total Environment, 344, 159-184.

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/10/C3792/2013/hessd-10-C3792-2013-supplement.pdf

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 7733, 2013.