

## ***Interactive comment on “Kalman filter approach for estimating water level time series over inland water using multi-mission satellite altimetry” by C. Schwatke et al.***

**J.F. Crétaux**

jean-francois.cretaux@legos.obs-mip.fr

Received and published: 29 June 2015

I will not comment here the methodology and will not suggest a full review of the paper, but I am surprised by the results given in table 3.

A previous study was done in Ričko M., C.M. Birkett, J.A. Carton, and J-F. Cretaux, Intercomparison and validation of continental water level products derived from satellite radar altimetry, J. of Applied Rem. Sensing, Volume 6, Art N°: 061710, DOI: 10.1117/1.JRS.6.061710, 2012

it was an article with the aim of comparing the water level products for lakes of 3

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



database that are also used in the present article. The methodology of comparison between both article looks to be the same (calculation of RMS of differences between satellite product and in situ level, and calculation of the R2 coefficient). In the present article the product from the DAHITI database is added to the general comparison, and there are between both articles, seven common lakes. The fact I wish to point out and wish the authors give explanation, and at least refer in their article to ricko et al., 2012, is that for the 3 other database (Hydroweb, GRLM and ESA/DMU) the accuracy and the correlation calculated in the present article are much worse than what was present in the Ričko et al., 2012 article.

I made a summary table of both comparisons: those made in Schwatke et al, those made in Ričko et al. See below.

Lake name	Schwatke et al., 2015	Ricko et al., 2012	RMS (cm) / R2	RMS (cm) / R2
Superior	5-6	0.94-0.95	6 / 0.97	Michigan 7-12 / 0.82-0.95
Ontario	6-7	0.94-0.95	6 / 0.98	Erie 9-18 / 0.69-0.92
Huron	6-11	0.92-0.98	8 / 0.99	Athabasca 33.7 / 0.79
Woods	43-44	0.58-0.63	27 / 0.81	

Table 1. Hydroweb comparison from Schwatke et al analysis and published in Ričko et al., 2012

Lake name	Schwatke et al., 2015	Ricko et al., 2012	RMS (cm) / R2	RMS (cm) / R2
Superior	11-12	0.62-0.75	5 / 0.97	Michigan 8-10 / 0.73-0.95
Ontario	11	0.85	6 / 0.98	Erie 14-20 / 0.61-0.79
Huron	7-12	0.90-0.96	6 / 0.99	Athabasca 55.7 / 0.27
Woods	Not calculated	Not calculated	19 / 0.86	

Table 2. GRLM comparison from Schwatke et al analysis and published in Ričko et al., 2012

Lake name	Schwatke et al., 2015	Ricko et al., 2012	RMS (cm) / R2	RMS (cm) / R2
Superior	11-12	0.62-0.75	5 / 0.97	Michigan 8-10 / 0.73-0.95
Ontario	11	0.85	6 / 0.98	Erie 14-20 / 0.61-0.79
Huron	7-12	0.90-0.96	6 / 0.99	Athabasca 55.7 / 0.27
Woods	Not calculated	Not calculated	19 / 0.86	

Superior 8-9 / 0.75-0.82 5 / 0.95 Michigan 5-7 / 0.69-0.78 7 / 0.93 Ontario 5 / 0.96-97 7 / 0.96 Erie 13-17 / 0.50-0.74 10 / 0.86 Huron 6-9 / 0.80-89 7 / 0.93 Athabasca 80.5 / 0.30 28 / 0.85 Woods 36 / 0.40-41 24 / 0.81

Table 3. ESA/DMU comparison from Schwatke et al (in revision) analysis and published in Ričko et al., 2012

Lake name Schwatke et al., 2015 RMS (cm) / R2 Superior 4-6 / 0.85-0.96 Michigan 5-7 / 0.82-0.95 Ontario 4-5 / 0.94-0.9\_ Erie 5-13 / 0.78-0.96 Huron 4-9 / 0.92-0.98 Athabasca 17 / 0.88 Woods 15-16 / 0.75-79

Table 3. DAHITI comparison from schwatke et al.,

It is worth to note that almost all the time the results are degraded from the accuracy assessment done by Ricko et al., 2012 to the present study. I'm for example very surprised by the high degradation observed for the GRLM solution of the great lakes with accuracy quite always higher than 10 cm while it has been assessed to be between 5 and 8 cm from Ricko et al., 2012 and if so keeps at the same order than what is obtained in DAHITI. The difference for lake Woods of Legos is also significantly degraded (28 cm to 43-44 in this article) and for the lake Athabasca of the DMU solution (28 cm from Ricko et al.; to 80.5 from this article) the difference is extremely high. For the correlation coefficient the degradation is very significant and for all of the cases. This needs explanation. I did for example the calculation for lake Erie with the Legos time series and the in situ and I found 9 cm and 0.97 (between 9 and 18 cm for Schwatke and 0.69 to 0.92, and 10 cm and 0.95 for Ricko et al., 2012).

Second point: I have downloaded the figure from Hydroweb of the lake superior which is also reported in the figure 7. The Legos solution (Hydroweb) on this figure looks very poor in terms of number of valid measurements (maybe due to the fact that all solutions are put on the same plot) but figure 7 is not representative of the real distribution of the corresponding time series on Hydroweb, particularly at the end of the time series

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

(see figure attached). It looks like the distribution of measurements is very irregular and sparse, which is not the case. please make this more realistic.

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 4813, 2015.

**HESD**

12, C2287–C2291, 2015

---

Interactive  
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

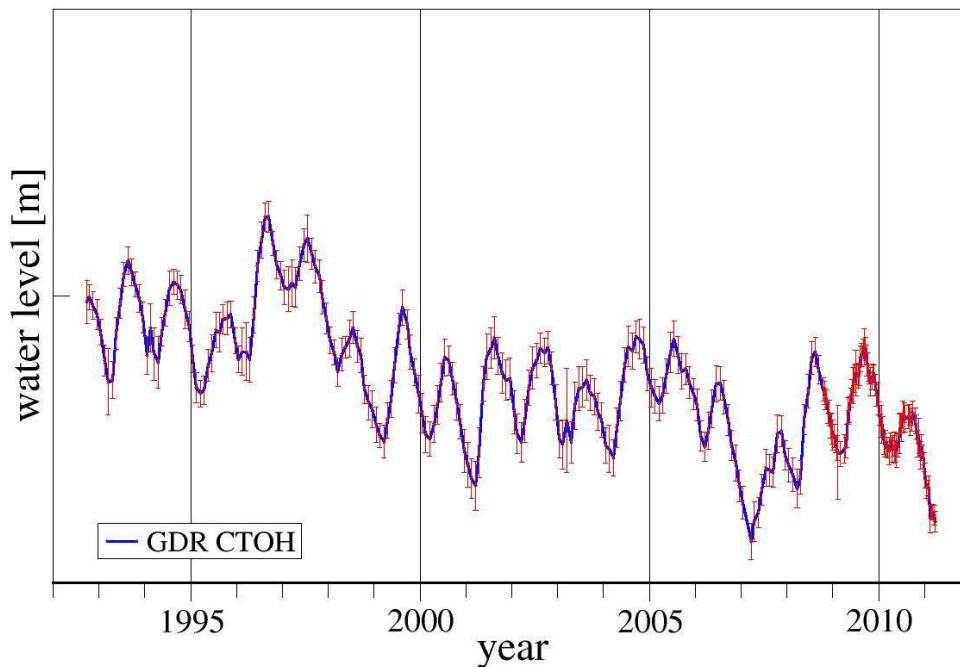
Discussion Paper

C2290





Lake Superior lat=47.00 lon=-87.00



Appropriate citation is : Surface monitoring by satellite altimetry  
Corresponding Author : [jean-francois.creiaux@legos.obs-mip.fr](mailto:jean-francois.creiaux@legos.obs-mip.fr)

© LEGOS \ GHOS 2011

Fig. 1. Lake superior: image down loaded from Hydroweb web site.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

