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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Surface seiches in Flathead Lake" *by* G. Kirillin et al.

Anonymous Referee #2

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The manuscript describes a novel method to extract the spatial seiche modes in Flathead Lake including rotary spectra that will be useful for other sites. The seiche frequencies are retrieved from a numerical model that is given an initial disturbance. Next the output at one location at the middle of the lake is used to find the significant peaks in the spectrum. These individual harmonics are then analyzed at all model grid point locations to get the spatial and temporal distribution. Based on the comparing of the full time series with the reconstructed harmonic time series at this single location the authors assume that by the total variance at all locations within the lake is conserved. Given the nodal structure of the modes this is not necessarily true and should be verified. It would be worthwhile to check the spatial distribution of the total variance explained by the 16 harmonics to see whether this is correct.

The fact that the present method does not give an idea of the absolute value of the

seiche surface elevation and velocity it seems a leap to state the importance of the seiche modes in sediment transport, coastal erosion and transport of biota. You need a quantitative assessment for that. Based on the measurements presented in Figure 10 the variation in the water elevation at the various stations is quite limited. Furthermore, it seems that the time scales of many of these oscillations are significantly longer than any of the modes discussed in the paper, i.e. more on the order of days than hours. To have a better idea of the seiche contribution to the changes in water elevation it would make sense to use the same harmonic decomposition of the measured time series, i.e. include the 16 harmonics only. That would allow for a quantitative evaluation of the seiche impacts and a connection to the coastal impacts. At present that is not the case and the conclusions in the manuscript are too strong.

The comments on the potential impact of seiches on overwash are interesting, but again it should be seen in connection with the wind- and wave induced set-up at that time. It is not a simple linear super position of the various contributions to get to overwash.

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