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## ***Interactive comment on “Observation of a local gravity isosurface by airborne LIDAR of Lake Balaton, Hungary” by A. Zlinszky et al.***

### **Anonymous Referee #1**

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The paper reports an interesting link between LIDAR measurements and the gravity field over lakes. We do not find many papers on this topic. From the theoretical point of view, the findings are not surprising, but worth to be published, as the paper gives a lot of information on computational strategies which allow for extracting the desired information (ellipsoidal surface height) from LIDAR data sets. However, the paper would get more importance by showing how and to which extent the proposed technique indeed yields a more accurate quasi-geoid solution when added to the classical approach. From the current figures, it is hard to see where the existing quasi-geoid map is improved (spatial pattern) and how large the improvement would be. Also, Figs 2a, b exhibit clear stripe pattern at some locations. Tackling this problem when converting the LIDAR data to height anomalies should be deeper discussed. In the paper, water level gauges are used only for correction purposes. The link between water

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level gauges and their normal height which directly yields the height anomaly at the gauge sites (provided there is no "lake topography" similarly to the well-known SST on oceans) is missing. One could directly see how the LIDAR derived height anomalies match the data the interpolated quasi-geoid grid relies on.

Technical aspects: Figure caption 2 is wrong (same as that of Fig. 3). Explain in more detail, what we really see in Figs 2a and 2b. What do we see in the inset of Fig. 2b (supplement)? It is not only a zoom; colors (especially on N-S stripes) differ clearly from that of the entire map.

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Interactive comment on Solid Earth Discuss., 6, 119, 2014.

**SED**

6, C38–C39, 2014

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