

Esurf-2013-36 - Final Response

Referee #1

First we will thank the reviewer for his very good and constructive comments. In the following we will try to answer the comments.

General Comments:

We agree that this paper has a strong methodology component. However, the purpose was more to focus on the results and processes going on a long a river bank. We understand that this part might be already be misleading in the title and needs further improvement and better description in the paper. We are working on it and are confident that we can meet the quality requirements with the revised version of the paper.

Specific Comments:

Scientific Significance: We agree with the reviewer that the TLS technique is not new enough to justify a scientific paper without new post processing input. Therefore, we did focus on the change in slope, rather than trying to interpret the mass balances.

We agree that that the explanation and results should be more detailed. The same will be done for the context in the revised version of the paper.

There are also some groundwater data available, for a very limited time. It should be possible to integrate these data for the short term changes.

Scientific Approach: The reason that we discussed the uncertainties in our data was to show, that we are aware of them. On the other hand are we confident that the errors have no effect on the observed processes. Detailed quantitative analyses are not possible because of the high differences in the water level.

We appreciate the reference input from the referee and will extend the reference list.

Presentation Quality: We understand the critic that we need to write more clearly. This leads to the misunderstanding that this would be a technical paper. The discussion and conclusion section will be revised with the goal to distinguish better between conclusion and discussion. In addition will be the aim, the erosion process, be clearer.

The idea of using vertical profiles for better visualisation will we do. It was on purpose to use horizontal retreat instead of the mass balance. The reason is that we think that these values are better to understand (A 1-D movement instead of a 3-D volume change). However, it makes sense to present it relatively to the time periods.

We will also follow the advice to improve the English.

Additional Questions:

3. The conclusions will be more broaden and the context will be presented in a better way.

6. We understand that all this questions are not clearly outlined and they will be answered in a sufficient way.

7. As mentioned above we understand that we have been not thorough enough to mention former work. This will be changed in the revised version of this paper.

8. We might change the title to get a better focus on the processes rather than the technical tools behind the research.

9. The focus will be shifted more to the processes as earlier recommended and as it has been our primary intention.

10. As mentioned before, the discussion and conclusion section will be reworked. We also intend to follow the advice to put the error and uncertainty analyses in a own section.

11. There will be a further proof-reader.

13. The figures are going to be improved and extended.

14. The references will be in the revised version.

Linewise Comments:

All comments for the text will be corrected and/or are mentioned in the comments above.

Referee #2

First we will thank the reviewer for his good and constructive comments. In the following we will try to answer the comments.

General Comments:

We understand the problem of dealing with errors and uncertainties. The title might a bit misleading to a more technical paper about TLS. The purpose of this paper is the focus of the processes, where the TLS has been used as a tool. *We believe that a more detailed error analysis has no influence on the process description.*

We do understand that the English has been unclear and this will be changed in the revised version of this paper. The referee did mention that the analyses of a DEM by difference are quite standard. That is a point we do agree. Therefore, we did show a different method. This is the change in the slope gradient. We would have appreciated if the referee would have commented on this method, too.

Scientific Significance: We agree that there is nothing new in the handling of the TLS. As mentioned before, the focus and conclusion will be changed toward the erosion processes. To our knowledge a field survey over more than 2 years with such a point density has not been conducted before.

Scientific Quality: We understand that the error detection and analyses we conducted is not state of the art. However, we believe that a better error analysis does not improve the outcome of the processes. We used the change in the slope angle rather the mass balance to describe the erosion process which happens in this riverbends. As the referee mentions in the detailed comments, the dual axis compensator of the TLS does not affect the slope measurements.

Presentation Quality: The figures will be improved for a better understanding. The same will be or the English.

Detailed Comments: We appreciate the additional recommended papers.

P953L1: Its rewritten.

P953L7: Its explained why high resolution is necessary.

P953L19: Its explained in more detail.

P954L22: technical details will be provided.

P956L1: The single steps in the post processing will be in more detail.

P957L1: Will be clear with more detail in post processing.

P957L3: We don't use the smallest value between the scans, but the smallest value between single grid cells. In this way we get the retreat for each position on the riverbank, not the mean retreat.

P957L8: The missing pixels have basically 2 sources: 1) filtering of the outliers. 2) Different height in water level. The missing pixels are a drawback, that's one of the reasons that we measure the horizontal retreat, and the slope.

Fig 3: will be improved.

P958L4: The discussion section will be rewritten with more focus on the processes.

P960L16: This section will be rewritten.

P961L1: We will see into this paper.

P961L4: We will follow this up.

P961L7: We will make the post processing more transparent.

P961L25: Our mistake, we corrected this.

P961L29: This will be rewritten to make it more clear and structured to the reader.