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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Selective deposition response to aeolian-fluvial sediment supply in the desert braided channel of the Upper Yellow River, China" *by* H. Wang and X. Jia

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Dear referees, Thank you for your letter and for the interactive comments concerning our manuscript entitled "Selective deposition response to aeolian-fluvial sediment supply in the desert braided channel of the Upper Yellow River, China" (nhess-2014-353). Those comments are all valuable and very helpful for revising and improving our paper, as well as the important guiding significance to our researches. We have studied comments carefully and have made correction, which we hope meet with approval. Revised portion a remarked in blue in the paper. The main corrections in the paper and the Revision Notes to the referee comments for (nhess-2014-353) are as

following: General Comments The referee comments think that there are obvious contradiction appear in both the standpoints. However, we insist that our conclusion is not a matter of debate. The discussions are as following: The first viewpoint of referee is that the coarser sediments deposited in both the channel bed and lower layers of the mid-channel bars in the river reach are the partial compound of “fluvial bedload” and sorted coarser grains from aeolian dunes. As referee see in general comments parts, the falling sands from the aeolian dunes and channel bank erosion must be sorted by river flow at different flow conditions and the sorted coarser fraction could be a part of bedload while the sorted finer fraction could be a part of suspended load. This part of “fluvial bedload” is also come from aeolian sand supplies and channel bank erosion. Thus, the source of the sediment at the channel bed are mainly aeolian sand supplies and channel bank erosion. From this point of view, we believe that there are significant consistency between the referee viewpoint and our main standpoint one. However, the “fluvial bedload” of the 2 point in the specific comments parts, it refers to the fluvial bedload from upper stream channel. From this point of view, as referee see in specific comments parts, the coarser sediment at the channel bed could be the compound of the aeolian sands and the fluvial bedload partially. However, the existing research results show that although fluvial sediment supplies from the upstream are larger in quantity than the aeolian sand supplies, they actually are wash loads, which shows a well-known phenomenon of “the more it come, the more it goes” (Wu et al., 2008), and therefore cannot be deposited in the main channel bed but can be deposited in slack water on bar tops and overbank during floods (Church, 2006). Since the braided channel is unstable and shifts in lateral, the bar or floodplain tends to be eroded and its surface finer sediments can be transported downstream as suspended loads, but the coarser subsurface sediments shows local erosion-and-deposition processes and thereby should be of the major importance in determining the braided channel morphology (Church,2006). Thus we still consider that the aeolian sand supply and bank erosion provides enough available bedloads which contribute to the primary bed sediments and control the development of the braided channel.

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The second viewpoint of referee is that the reduced sediment transport in the study river reach could not be the primary reason for the formation of the downstream "above-groundriver". However, the downstream"above-groundriver" is not discussed in this article. Our main standpoint 2 is that the lateral selective deposition reduces the downstream sediment transport and is a primary reason for the formation of "above-ground river" in the braided reach of the Upper Yellow River in response to aeolian and fluvial sediment supplies. This lateral channel shift makes the coarse aeolian sands to accumulate around the channel center and drives the suspended sediments to be deposited on the surfaces of the sand bars. During this lateral shift, the main thalweg bed had risen about 1.33 m on average with the range of 0.169 to 2.295 m during the forty-five years (Figure 8). The reason for the formation of "above-groundriver" in the downstream may be closely related to the human activities as referee sees, because there are continuous flood controlling dam construction. But, in the In the Ulan Buh desert reach, there are natural river bank. Thus, we insist that our conclusion without contradiction appears in both the standpoints.

Specific Comments 1. It needs to show the proportion of the coarser (>0.08 mm) and the finer (<0.08 mm) grains of the aeolian dunes. Response: Thank you for your comments. According to referees advices, we have collected 131 samples from isolated dunes at different positions of the surface, and particle size of screening results show that the mean percentage of the coarser (>0.08 mm) and the finer (<0.08 mm) grains of the aeolian dunes are 95.34% and 4.66% , respectively. Please see the line numbers 68-69.

2. No fluvial bedload has been monitored in the study river reach. However, the fluvial bedload from the upperstream channel must be existent and need to be considered. The coarser sediment at the channel bed could be the compound of the aeolian sands and the fluvial bedload partially. Thus, the present description and conclusion for the source of the sediment at the channel bed are inexact. Response: Thank you for your comments. However, the existing research results have been show that although flu-

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vial sediment supplies from the upstream are larger in quantity than the aeolian sand supplies, they actually are wash loads, which shows a well-known phenomenon of “the more it come, the more it goes” (Wu et al., 2008), and therefore cannot be deposited in the main channel bed but can be deposited in slack water on bar tops and overbank during floods (Church, 2006). Since the braided channel is unstable and shifts in lateral, the bar or floodplain tends to be eroded and its surface finer sediments can be transported downstream as suspended loads, but the coarser subsurface sediments shows local erosion-and-deposition processes and thereby should be of the major importance in determining the braided channel morphology (Church,2006). Thus we still consider that the aeolian sand supply and bank erosion provides enough available bedloads which contribute to the primary bed sediments and control the development of the braided channel.

3. The abbreviation in Fig. 3 needs to be annotated. Response: Thank you for your comments. According to referees advices, the abbreviation in Fig. 3 have been further improves. Please see the Fig. 3.and the line numbers 307-308.

4. Sometimes there are no point bars (side bars) in the opposite bank, but mid-channel bars are (e.g., from 1966 to 1969, Fig. 7). Please notice that typical point bars commonly just appear in meander belts of a meandering channel pattern. Similar bars appeared in a braided channel pattern be commonly called as side bars. The sand bars between channels commonly be called as mid-channel bars. Response: Thank you for your comments. According to referees advices, the “point bars” have been corrected as “side bars or mid-channel bars”. Please see the line numbers 143-149.

5. Fig. 11 shows that the suspended sediment load at the Bayangaole gauging station is greater than that at Shizuishan gauging station. It indicates that a portion of the aeolian dune sands are transported as suspended sediment load. Response: Thank you for your comments. Fig. 11 shows that the suspended sediment load at the Bayangaole gauging station is greater than that at Shizuishan gauging station. It indicates that a portion of the surface finer sediments from the bar and floodplain

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are transported as suspended sediment load. Because of the channel shows high-rates of lateral shifts in response to high-rate flow discharges, the bar or floodplain tends to be eroded and its surface finer sediments can be transported downstream as suspended loads. In addition, the proportion of the finer (<0.08 mm) grains from the aeolian dunes are very few, the mean values is 4.66%. We hope that the revised paper is more reasonable and objective. Please see the line numbers 161-165.

Please also note the supplement to this comment:
http://www.nat-hazards-earth-syst-sci-discuss.net/3/C560/2015/nhessd-3-C560-2015-supplement.pdf

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 1269, 2015.