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Hydrology and Earth System Sciences Discussions

Interactive comment on "Rapid channel incision of the lower Pearl River (China) since the 1990s" *by* X. X. Lu et al.

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GENERAL COMMENTS

The paper is about the morphological changes that occurred in the Pearl River in response to human impact, in particular to sand mining. It is an interesting case study since it reports about a large river (previous studies were mainly about smaller rivers) and it documents a very rapid phase of channel incision. Good data are used to analyse channel changes. It is a good paper overall, but I think it needs some revisions before publications. More specific comments are listed below.

SPECIFIC COMMENTS

1 - Language: English should be improved. Example: I do not think the expression

“fluvial river” is correct (pag. 2206 - row 19).

2 - “2 Study area”: this chapter could be integrated with information about the river, specifically regarding channel morphology (e.g. channel width, slope, pattern) and bed and bank composition.

3 - Rapid channel incision: what about channel variations before 1990 ? It would be relevant to have some data about channel morphology before 1990 to understand if channel incision occurred only after 1990 or some changes occurred before that date. Such pre-1990 data will be useful to understand relation between channel changes and cause (e.g. sand mining).

4 - “Pag. 2210 - row 4”: is the Arno the river that should be cited here instead of Po ?

5 - “4 Results - pag. 2212 row 4-6”: the slope of the river is very low and I am wondering if the slope increase that occurred (from 0.000063 to 0.000070) is so relevant in terms of channel hydraulics (e.g. shear stress, stream power) and subsequent effects.

6 - “5.1 Discussions”: more explanations about sediment fluxes and sediment extracted would be useful; 59.8-68.9 Mt is the total load or the suspended load ? Is coarse fraction extracted from the channel bed equivalent to the bed-load ? Is it possible to make an estimate of proportion of the different components of sediment load (suspended load, bed load) ? In other words, if the sediment extracted (sand) correspond to bed-load, it is important to stress that the extracted volumes could be much higher than average bed-load transport rates.

7 - “5.2 Discussions”. The average annual sediment loads have decreased of about 20 %: again (see above) it would be useful to explain if the reduction refers to the total load or to suspended load. In any case should 20 % of decrease be considered a significant variation in relation to the channel adjustments that have been observed ?

8 - “6 Conclusion”: this chapter should be improved, there are parts that could be removed and the main results/conclusions of the paper should be reported more clearly.

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For instance, I suggest to move a part of this chapter (row 16-25 pag. 2214) to chapter 5 (“Discussion”). In the chapter “Discussion” it could be worth to have a section dealing with environmental effects of channel incision (e.g. salty water intrusion).

9 - Figure 2: it is not clear; I have a couple of suggests: a) put only some of the cross-sections instead of all the available 14 cross-sections; b) replace the figure with temporal trends of bed elevation (e.g. thalweg elevation or average level of the bed).

10 - Figure 3: it is not clear; like for figure 2, I am wondering if it would be better to report only some of the data which will give the possibility to see better temporal variations.

11 - Figure 5: same comment as for Figures 2 and 3.

TECHNICAL CORRECTIONS

1 - MT: I suggest to use “Mt” since “T” is commonly the symbol for tesla (magnetic flux density).

2 - Pag. 2208 - row 5: it would be useful to mention the drainage area of the Pearl River at the end of the previous chapter, where other rivers are reported.

3 - Pag. 2210 - row 3: Fig. 2 instead of Fig. 2a.

4 - Figure 4a: is the “Altitude” above sea level (a.s.l.) ?

5 - Figure 6: is water level above sea level ?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 2205, 2007.