

**Paper title:** Spatio-temporal patterns of the effects of precipitation variability and land use/cover changes on long-term changes in sediment yield in the Loess Plateau, China

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### **General comments**

The paper is based on a desktop study of the “Spatio-temporal patterns of the effects of precipitation variability and land use/cover changes on long-term changes in sediment yield in the Loess Plateau, China” i.e. no measurements were performed by the authors. This is, in my own opinion, a very exciting study as it attempted to decouple impacts of two very important controls of sediment generation at catchment scale. Several data sources were consulted and a number of analyses performed, in my own opinion, very well. Great detail is provided and was easy to follow what the authors did to the data collected. This paper will add useful information to the body of knowledge on one of the most important river basins in the world insofar as sedimentation is concerned and should be supported to get it published. Apart from the too many errors, mostly of a grammar nature (understandably most of the authors appear to be non-native English speakers), the authors can do with summaries to some parts of the results presentations. In addition, the structure of the paper, especially the omission of a separate Discussion section, cast further doubts on whether due internal editing of the draft was done before submission for peer review. If the idea was to combine result presentation and discussion, then some parts lack adequate discussion of the results.

Overall, I see this as an important paper which should be published after corrections and improvements as will be indicated below.

### **Specific comments**

#### **Abstract**

Line 25: Insert the exact study period in that sentence, i.e. 1961-2011, not just 50 years.

#### **Introduction**

Line 75: ... in China. This is the ...: combine these two sentences as “... in China, which is the ...”

Line 80: put comma (,) after SWCM

Line 81: put comma (,) after “reestablishment”

Line 83: ... on slopes exceeding ...; replace “implemented” by “launched or started”

Line 85: no double full stop, “i.e. ...” should be “i.e.”

Line 87-88: ... hydrological regimes of the LP in combination with ...

Line 89: ... declining trend ...

Line 93: ... contribution of ...

Line 94: ... between 64 and 89% ...

Line 95: what kind of results did Zhao et al (2017) get? Just present a summary like you did for the other references used in this paragraph.

Line 96: Zhang et al (2016) pointed that ...

Line 100: ... between the 1970s and 1990s ...

Line 102: ... of these studies ...

Line 105: Sun Q et al., 2015; Sun W et al., 2015, please make one “a” and the other one “b” and then remove their initials i.e. Sun et al., 2015a; 2015b, even if they are different people. I think this is better than present their initials.

Line 108: They will also ...

Line 112: ... region (Figure 1) located in the ... LP. The CSHC supplied ...

Line 113-4: This region was the focus of our ...

Line 115: ... of this study were, therefore, to ...

Line 118-9: Move “from 15 catchments within the region” to Line 114 between “... sediment load” and “within ...” to read “... sediment load from 15 catchments within the region within ...”

Line 124: ... the Toudaoguai and Longmen ...

Line 126: ... long and its drainage catchment covers  $12.97 \times 10^4 \text{ km}^2$ , which is ...

Line 128: ... precipitation in the region during 1961-2011 was ...

Line 129: rearrange to read “... varied from lower than 300 in the northwest to 580 mm in the ...

Line 133: delete CSHC to read “... within the region ...”

Line 136: ... along a north-south ...

Line 139: put a reference ... hydrological data during 1961-2011 (REFERENCE). Characteristics ...

Line 140: ... catchments are presented in Table 1 and Figure 2, showing that the catchments ...

Line 142: ... (#1-6) had relatively ...

Line 145: ... (#7-14) were ...

Line 148: delete CSHC

Line 151: delete CSHC

Line 152: delete CSHC

Line 156: **2.2 Data collection**

Line 159: delete CSHC, and insert (Figure 1) i.e. ... region (Figure 1) were obtained ...

Line 162: The hydro-meteorological data ...

Line 167: is it catchment slope gradient?

Line 177: delete **2.2 Methods**

Line 178: **2.3 Trend test**

Line 195: ... this method, a regression ...

Line 212: This was, therefore, used ...

Line 223: Figure 4 shows ...

Line 224: delete CSHC

Line 225: ... whole area was occupied by ...

Line 226-7: ... was no significant change ...

Line 232: ... (Figure 4). In the period 1975 to 2000, ...

Line 239-40: ... terraces were seen ... control projects were ...

Line 241: Although the area utilized for engineering ...

Line 242: ... they immediately and substantially ...

Line 244: ... catchment area) increased from ...

Line 246: ... watersheds and the 2000s ...

Line 247-49: Some decreases ... destroyed". Please do not keep the readers curious here, may you give more light to what happened.

Line 250: delete CSHC

Line 255-7: In the period from 1982-1990 to ... increase of LAI ... sub-catchments was ...

Line 260: ... during the period 1961-2011.

Line 261-2: Jialu did not decrease, isn't it?

Line 267-8: The corresponding Q, SSY, SC and C for the whole region were ...

Line 270: ... whole region were ...

Line 273: ... and Cs for the fifteen ...

Line 276: ... with distinctly different ...

Line 290: ... indicate substantially different ...

Line 297: On average, LUCC ...

Line 298-300: ... period-2, with their respective contributions to sediment load reduction from the reference period to period-3 being 88.67 and 11.33%.

Line 301: ... than in period-2 as ...

Line 305: ... increased and thus the contribution ...

Line 314: Correlations between the potential factors ...

Line 317: ... (see Table 4) showed that check-dam ...

Line 318: ... period to period-2. Pasture ....

Line 319: ... acted as the dominant ...

Line 322-324: Based on the above results, the variation ... depended on precipitation in the reference period before LUCC took effect and any spatial ... of SSY in the catchments were controlled by ...

Line 325-7: ... (period-2 and period-3) when increased LUCC had taken effect ... considerably. The decrease of ... insignificant and LUCC contributed over ...

Line 328-9: ... SSY depended more on ... surface area and ... possibly played a secondary ...

Line 330: ... yield was dependent ...

Line 331-2: ... framework, data were next analysed to generate ... patterns constituting respective ...

Line 335: ... Table 3. The spatial ...

Line 337: ... period, most of the ... How many? I think you can state the figure here.

Line 339: ... was significant in eleven ... Is it? I see 10!

Lines 340-342: Move "Overall, the regressed ... yield changes" to line 353, immediately after "... group of  $0.2 < a < 0.3$ ".

Line 352: ... the Shiwang ... I do not understand this.

Line 355: ... as indicated by lower  $R^2$  ...

Line 356: ... values in Table 3. The slopes of the regression lines in the ...

Line 357-8: ... except in Huangfu, Gushan and Kuye which increased slightly.

Line 360: no double full stops ... (Figure 9a and 9b).

Line 362-3: ... yield were weaker compared to the reference ...

Line 364: ... relationships between ... yield were not significant in all the ...

Line 365-7: The slopes of the regression lines during period-3 decreased sharply (Table 3). Six catchments (five in the ...part) had negative regression slopes (Figure 9c).

Line 368: ... precipitation decreased greatly ...

Line 369-70: ... did not lead to increased sediment ...

Line 371: ... during period-3 were clearly different from ... period and period-2 (compare Figure 9c against Figure 9a-b).

Lines 375-458: Sounded like a mixture of result presentation and discussion. You need to decide on a style of writing that is consistent throughout the paper.

Line 377: ... with time. The impacts were ...

Line 390: ... In order to fully explore ...

Line 392: ... scenarios would be needed (Ma et al., 2014; ...

Line 407: ... more detail and taking ...

Line 412: ... on 25<sup>th</sup> August ...

Line 413: ... 10<sup>th</sup> August ...

Line 420: ... be considered when investigating ...

Line 422: **3.5 Spatio-temporal pattern** ... This is the most important from the paper as deduced from the title of this draft paper; therefore, readers expect it to come early in the discussion.

Line 423: Why did the results drift from CSHC to LP? This study is about CSHC, not LP; even though CSHC is located within LP. I see some kind of mix-up starting with this section.

Line 430: ... area to retain precipitation ... What do you mean? I think there is a better way of saying what you are trying to say.

Line 437: ... in the LP, which trapped ... Is it about LP now? Are the results presented here on LP or CSHC?

Line 439-40: ... progressively filled with ... restoration played a greater role in controlling soil erosion.

Line 441: In order to quantify the effects ...

Line 443: ... 15 catchments were analysed ...

Line 447: The correlations were ...

Line 449: ... correlations between sediment coefficients and conservation measures were stronger ...

Line 456: ... respectively. Half ...

Lines 460-464: "The Loess ... insignificant" is just a summary of what happened in the LP and not a conclusion on the study results. I suggest suppressing this or moving elsewhere.

Line 465: ... study has shown that long-term ....

Line 466: ... located in the CSHC region.

Line 468: ... and landscape controls for the period 1961-2011.

Line 469: suppress "(1961-2011)"

Line 472-5: ... measures, there were major reductions in streamflow (65%), sediment yield (88%), sediment concentration (68%) and sediment efficiency, i.e. annual sediment yield/annual precipitation (86%) over the entire 50-year period.

Line 476: ... catchments also exhibited interesting ...

Line 478: Before LUCC took effect, the data indicates ...

Line 485-6: ... yield, thus ... controls.

Line 487: ... linear decreasing ...