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Hydrology and Earth System Sciences Discussions

Interactive comment on "Floodplain sediment from a 30-year-recurrence flood in 2005 of the Ping River in northern Thailand" *by* S. H. Wood and A. D. Ziegler

Anonymous Referee #3

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General Comments: The authors did not spend adequate time addressing the main goal of the paper: to understand the extent that deposits from summer-monsoon floods can be identified in floodplain stratigraphy. A more focused discussion should include an investigation into the grain-size data, photo evidence, etc to identify individual flood deposits. The results and discussion that address the secondary goal of the paper (sedimentation processes and patterns associated with a flood) are not convincing and have alternative explanations. A natural extension of the primary goal of the paper would be a discussion section on the variable responses of northern Thailand rivers to different typhoon systems. Why was the study area inundated for a couple of months

after the August 2005 storm and for a much shorter period after the Oct 2005 storm? The authors also never fully tackled a discussion focused on flood deposit thickness as a function of available area, rainfall, river suspended sediment concentration, river gradient, river catchment size, etc. Discussion is confused within the results discussion and the discussion section needs extreme revision and refocusing.

Specific Comments The abstract is written a bit awkwardly. The focus of the abstract is the flood deposit emplaced between Sep 28 – Oct 2, 2005, but the wording of the abstract does not explicitly point out that the authors measured a flood deposit. Additionally, more needs to be written in the abstract supporting the authors’ observations of sedimentation processes/patterns to justify the last two sentences. The last two sentences give the impression that the authors studied preservation potential over longer time-scales than a single monsoon season. No mention of measuring bioturbation or of investigating bioturbation rates in other studies was mentioned in the paper, so it is unclear why it is mentioned in the abstract. It would be good to see a discussion of bioturbation in the paper.

Throughout the paper, the dates of the storms/floods are inconsistent. Page 3841 says that the storm dates were 13-16 August, 20-22 Sept, and 29-1 Oct, 2005. This is inconsistent with dates in the abstract (28 – 2 Oct) and later in the paper. It appears the authors may be talking about two types of events with different dates: 1) the dates of the storms and 2) the dates of flooding. The authors should say up front if they are using different dates to talk about storms and floods and then use terms and dates consistently.

May need another location figure to show all locations mentioned in this paper.

The introduction might be improved if the authors rearrange the paragraphs so that general storm/typhoon patterns are discussed first, followed by discussion of which areas in northern Thailand see frequent flooding, and then the area and storms of interest in this study. There is no mention of how floodplain area affects flood deposit thick-

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nesses. Additionally, there must be some references to highlight the authors’ point that “floodplain sedimentation is related to the duration of the over-bank stage and the concentration of suspended sediment at the time of inundation”. Lines 25 -28 on page 3842 of the introduction are confusing because the abstract did not mention that the authors were interested in understanding “the nature of storms producing 30-year recurrence floods”.

In section 3, is it true that the peak flood on September 29 occurred before the peak rainfall on Sept 30 (from Fig 4)? Why might this happen? It is also unclear from the text why the paleo-flood record of the Mae Chem River indicates that much larger floods may have occurred on the Ping River before 1950. Maybe the authors could expand this line of thought.

In Section 4, Measurements, the authors state that GPS precision was +7 m. Was that horizontal or vertical or both? What is the error of the elevation measurements in Fig 8 across line x to x'? Were there storms between Oct 2005 and March 2006 when the measurements were made? There is no figure in this paper that shows the actual locations (more than 200) of flood deposit measurements. How did the authors verify that the “darker, firmer, gray mud of the August depositional surface” was the August depositional surface? I am not convinced that the measurements of sediment thickness on the bamboo huts measured flood depositional thickness rather than how much mud could physically adhere to the platforms. If the floors of the huts are composed of planks with gaps in between, the thickness of sediment on top of the planks was likely determined by the stickiness of the mud. It would be helpful if the authors added information to support this method of observation. Very general descriptions of sediment texture are given throughout the paper regarding the flood deposits. How did the authors evaluate grain size in this study?

Section 5.1 starts off presenting suspended sediment concentration measurements. The methods used to get these suspended sediment measurements should be presented in section 4 (Methods).

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Section 5.2 contains a sediment budget for the area. This might be better presented in the discussion section with text supporting why 60 % water content was chosen and why thickness was averaged over the study area. The detailed thickness map in Fig. 11 could have been used to make a more precise sediment budget for the area. The discussion on page 3846, lines 18 -25 is unconvincing. The conclusion at the end of the paragraph does not belong in results and is not supported by the data. An alternative explanation could be that the huts were not inundated for as long as the underlying ground, resulting in less sediment deposited on the hut floors. This entire section is discussion.

Section 5.3. Do the authors know that the burrows were made by insects as opposed to some other type of burrowing creature?

Section 5.4 Grain size methods should be brought up in the methods section. If measured water content ranged between 0.67 -0.83, why did the authors use 0.6 in their estimation of the sediment volume in the study area (section 5.2)? The authors state that the grain size diminishes with distance from the tributary, but this is not the case for samples G and E. Maybe the authors could expand on the causes of grain size distribution in the discussion.

Section 6.1 It is unclear why the authors used a discharge of 1.5 ms-1 for the tributary discharge. The section estimating how long it would take to deposit ˜3.3 cm of sediment seems arbitrary and hard to follow. It is also unclear what this part of the discussion adds to the paper.

Section 6.2 This section would be easier to understand if the authors also discussed the study area in the context of the whole Ping River system. And then compared to other river systems.

Technical Corrections Is the Ping River really a tributary of the Chao Phraya River? If so, then Fig.1 needs to be amended.

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Interactive Comment

Page 3840: Line 6: period missing after “floodplain stratigraphy”.

When you say “sediment depths” and you are referring to the flood deposit, it would be clearer to say flood deposit. (e.g. lines 8-9).

Line 11: “However” is not needed.

Line 15: A semicolon is not needed after “800-1500 mg L-1”; use a comma.

Line 24: Do the authors mean masses “of moist air” rather than storms?

Page 3841: Line 2: dates 13-16 August do not match dates listed in Fig 2 caption which says flooding started on 12 August.

Line 13: where is the Chiang Mai P1 gauge? Inconsistent spelling of gage/gauge here and on page3844, line3.

Line 15: reference both figures 1 and 3, because Hainan is labeled in Fig.1.

Page 3842: Lines 4-10: Where is Petchabun Province, Dannang Province of Vietnam, Uttaradit and Sukothai Provinces of northern Thailand? (Not shown on Figures.). Would it add to the paper to have a map showing the various typhoon tracks over northern Thailand since the authors spend a lot of time talking about the various storm tracks?

Lines 13-14: Were these sediment concentrations measured during floods? Why is silt in parentheses? Rewrite lines 13 -15 to avoid awkward punctuation: “Sediment concentrations during large flows in the Ping River typically exceed 500 mgL-1 (ref). Although not documented in detail, these sediment concentrations indicate a potential for substantial silt deposition (ref?).”

Page 3843: Line 3: Reference to Fig 3 is not appropriate here.

Page 3844: Line 1: The Ban Ko village study area is not shown in Figs 2-5. Would Fig

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9 be better?

Lines 2-4: Where is the P-1 stream guage at the Nawarat Bridge? Page 3845: Line 8: Need a period after “August depositional surface”.

Page 3845: Lines 17 -20: A few articles are missing: a) “A total suspended sediment concentration…” b)“The sample was taken...” c) “The river was in full flood at 740 m3s-1, 4.9 m stage” Additionally, the location of the suspended sediment sample is not shown on location figure. Line 19: gaging or gauging Line 21: “sediment rating curves measured between 1994 and 1997 (Fig 10.).” Lines 23 -26: Use a period after :…data for the Ping River”. Is the 75 km2 tributary the one feeding into the Ping River in the study area? How extensive is the unpublished record?

Page 3846 Line 6: The authors measured flood deposit thicknesses, which is more specific that “thickness”.

Page 3847 Lines 9-11: this sentence is very awkwardly worded and hard to decipher. Lines 20 -27: use percent or %, not per cent.

Page 3848 Line 10: I am unsure why Fig 10 is referenced here.

Page 3849 Line 6: “each water columns” should be column. Line 26: A semi-colon should not be used here.

Page 3850 Line 2-3: mention studies, but only reference 1 paper. Figures: Figure 1: Indian Ocean is mentioned on page 3840, but not shown on figure 1.

Figure 2: An extensive list of provinces and districts are mentioned on page 3841 to indicate that northern Thailand was inundated during the floods of Aug – Oct, 2005. The capitals of these areas are shown in Fig. 2. Some of these cities are not part of the Ping River drainage. Is it necessary to list them? Also, a line showing the location of the Mea Ngad Dam might be more helpful than the arrow. The red dotted line outlines more than the Ping River drainage upstream of the study area. There are

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also light gray place names that clutter this figure.

Figure 4. Where is the Ban Pahng Ma Oh Watershed Research Station?

Figure 8: Does not show outline of 0.27 km2 study area as referenced on page 3845, line 5. It is unclear what the blue- and tan-dashed lines are meant to represent. Are the dual black lines meant to be roads?

Figure 13. “Photographs shown…Fig. 5” Should be Fig. 11 locations of A, B, P1, and P2. Caption also refers to grain size analysis in Fig 10, but Figure 10 is suspended sediment concentration.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 3839, 2007.