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Comment

Comment on "A new discovery of the Early Cretaceous supercritical hyperpycnal flow deposits on Lingshan Island, East China." by Yang Tian et al. in *Acta Geologica Sinica* (English Edition), 2017, 91(2): 749-750

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Yang Tian et al. (2017) recognize bed-load-dominated and suspended-load-dominated hyperpycnites in the Beilaishi section, but we maintain that only Fig. 1b is well consistent with their descriptions. The interface existing in the lower part separates it into two thin-bedded grading deposits then with climbing ripples in Fig. 1c, which thus be thought to be deposited by surge-like turbidity currents. Besides, they also interpret pebbly coarse-grained sandstones with floating pebbles as bed-load-dominated hyperpycnal flow deposits (Fig. 1f). However, we suspect that these thickly bedded coarse-grained deposits could be hardly linked with the river-derived origin. Modern submarine monitoring shows that hyperpycnal flows usually have limited run-out behaviors and low sediment-carrying potentials for generating bed-load-dominated deposits (Talling et al., 2014). Thin fine-grained deposits (e.g. silt and clay) will characterize most high-frequency small- to medium-scale hyperpycnal floods (Talling et al., 2012; Talling et al., 2013; Yang Renchao et al., 2016). Are there sufficient paleoclimatic and paleoenviromentalevi-dences for triggering a mega flood event (Yang Tian et al., 2015a, 2015b)? Nevertheless, ~40-cm-thick beds will be usually questioned for a single flow event (Kane and Hodgson, 2015). Hence, we here reinterpret it as pebbly coarse-grained sandstone with spaced stratification, and ascribe it to the internal flow unsteadiness and varying depositional rate of high-density turbidity current instead of vertical waning-waxing trends (Cartigny et al., 2013). These depositional behaviors could form centimeter-thick, alternating coarsening- and finning-upward intervals, which is conformable with the depositional characteristics observed in Fig. 1f.

Yang Tian et al. (2017) also state that there are a variety of supercritical-flow deposits in this section. They interpret Fig. 1d with gently dipping fore- and backsets as the deposits of breaking antidunes, but most lamina sets are actually characterized by concave-up and convex-up sigmoidal profiles. Typical supercritical-flow deposits with breaking antidunes show undulating basal lamina sets with variable angle discordances and the alternation of foresets and backsets on the top at lower aggradation rate (Cartigny et al., 2014), but these sedimentary structures are not well manifested in Fig.1e. As for us, the convex-up and concave-up lamina sets can be alternatively described as a small-scale hummocky and swaley cross-stratification. Moreover, backset stratification is a very significant element of the deposits of chute and pool especially at higher aggradation rate (Cartigny et al., 2014), however, it is not recognized according to the description. Laminae marked by yellow solid lines may resemble backset stratification, but they are tangentially contacted with the laminate set, indicating the ripple origin. Both two figures thus suggest the significant role of oscillatory flow and wave reworking (Fig. 1d, 1e). Besides, we also focus on the new discovery of a complete cyclic step in Fig. 1h. Aside from the crude delineation of lamina sets, basal structureless or coarse-tail normal graded deposits with prominent liquefied structures and typical sequence of top-cut-out turbidite bed are not observed in this work. The sub-horizontal backsets on the lee side and the crest of the stossside, seems to be slightly thicker than oblique backsets on the stoss side as Yang Tian et al. (2017) interpret in Fig. 1h. This interpreting model is largely contradicted with the spoon-shaped or lenticular architecture of cyclic step deposits since the crest of stoss side and lee side are usually subject to erosion (Postma and Cartigny, 2014; Postma et al., 2015). Therefore, we believe that the analysis of paleoflow direction should be reconducted before revisiting these deposits, and the recognition of cyclic step deposits requires a panoramic view.

In summary, these deposits will most likely to be linked with surge-like turbidity currents, while some of them are usually reworked by waves. The frequency of hyperpycnites will be much lower than they recognize.

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Additionally, more comprehensive analysis of paleoflow direction should first need to be done to show potential depositional settings of the upper part of the Early Cretaceous Lingshandao Formation in the Beilaishi section.

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