# Rapid and widespread response of the Lower Mississippi River to eustatic forcing during the last glacial-interglacial cycle: Reply

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Otvos (2013) raises a series of concerns about our recently published paper on the late Quaternary evolution of the Lower Mississippi River (Shen et al., 2012). We first note that his comments feature a variety of claims (e.g., on the amplitude of sea-level changes, climatic controls on sediment supply, and timing of tectonic uplift) that are not supported by either data or references. We reply here to those aspects of Otvos' seven points that have a bearing on the main findings of our study. We refrain from responding to the numerous comments that (1) are irrelevant to the primary conclusions of our paper, such as the use and definition of allostratigraphic units (points 2 and 6) and the age of brackish facies at the Sorrento I site (point 2); (2) misrepresent our paper, such as the claim that we failed to provide analytical optically stimulated luminescence (OSL) data (point 7), which are detailed in GSA Data Repository item 2012110; or (3) are disagreements with other workers not involved in our paper (points 6 and 7). Otvos also incorrectly claims (point 5) that we disregarded postdepositional regional uplift and subsidence; we discuss these phenomena (illustrated in Shen et al., 2012, Fig. 12) on p. 699.

Otvos questions (point 7) our inference that bioturbation potentially affects some of the shallowest OSL ages. However, we explicitly pointed out that this issue is not yet fully resolved. For this very reason, we offered an alternative explanation (p. 698) of localized Mississippi River overbank deposition during marine isotope stage (MIS) 3, even though the currently available evidence leads us to favor the bioturbation scenario.

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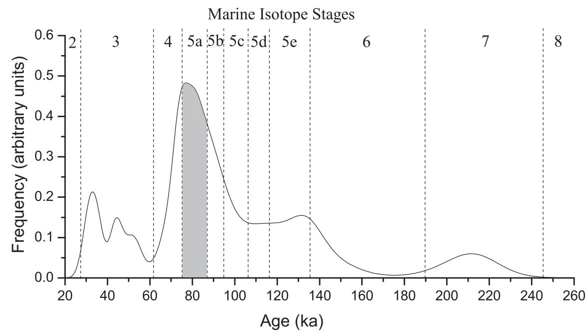
**Figure 1. Frequency histogram of optically stimulated luminescence (OSL) ages reported by Shen et al. (2012), based on the 25 OSL ages of the Prairie Complex that are not affected by sampling problems. A 3σ error range is used for each OSL age. The dashed lines represent marine isotope stage or substage boundaries adapted from Waelbroeck et al. (2002).**




Otvos expresses concerns about our correlation of OSL ages with late Pleistocene sea-level highstands (points 2, 3, and 4) and challenges our finding that the MIS 5a-4 transition was characterized by widespread floodplain abandonment and incision. To further illustrate our OSL chronology, we include a frequency histogram of all OSL ages with the exception of those affected by sampling problems (Fig. 1). The histogram exhibits a particularly striking peak that coincides mainly with MIS 5a. We subsequently calculate the fraction of the frequency during MIS 5a, amounting to 23%. We note that this value far exceeds the fraction of MIS 5a time (5%) within the 245 ka to 25 ka time span that our data set covers. It is this clustering of OSL data within such a short time interval that led us to conclude that a significant portion of the Prairie Complex aggraded in association with the MIS 5a sea-level highstand. The widespread abandonment of the MIS 5a floodplain is not only demonstrated by our OSL data, but also by the position of long profiles from MIS 4 and 3 that occur at elevations ~10 m below the MIS 5a long profile at ~31°N (Rittenour et al., 2007).

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