A response to Keates and Kuzmin

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Susan Keates and Yaroslav Kuzmin have contributed valuable comments on our assessment of the chronology and technological characteristics of Shuidonggou localities 1 and 2. These comments have demonstrated some discordance in our publications that should be corrected here. Their rationale for abandoning the conclusions altogether is, however, weak at best. Most importantly, there is no reason to return to the chronology for the Initial Upper Palaeolithic (hereafter termed IUP) assemblages at the Shuidonggou site complex (SDG) proposed by Madsen *et al.* (2001). Keates and Kuzmin's critique focuses on two separate issues: the first is our characterisation of the assemblages from the lower part of SDG 2, and the second is our handling of the dates. We will address these in order.

There is no contention that SDG 2 yielded relatively few artefacts indicative of the IUP with Levallois-like blade production. It appears that Keates and Kuzmin at least agree with us that the cores identified are typical of the IUP and not the small-flake tool assemblages. Yet the layers from which these artefacts were recovered (5a and 7) yielded comparatively small assemblages, so we would not expect many diagnostic forms. The fact that there are many more large blades and cores from SDG 1 than from SDG 2 is immaterial—a much larger volume of sediment has been excavated at SDG 1 over the years, and the collections of artefacts are significantly larger as a consequence. The rest of Keates and Kuzmin's argument is difficult for us to follow. They state that "No other artefacts were found in CL5a and CL7" (p. 715) when in fact other artefacts are tabulated. The reality is that the majority of the finds are simple undiagnostic flakes, which do not help to distinguish the technology of blank production.

Although they do not state it directly, Keates and Kuzmin also appear to assert that there is evidence for IUP artefacts and blade production throughout the SDG 2 sequence. This claim, however, is without basis. Much larger assemblages from other cultural layers (CL1–4) are very clearly representative of simple flake technology and lack evidence for IUP Levallois blade production. Pei *et al.* (2012) did refer to 28 blades from SDG 2, but this was from a sample of 15 942 stone artefacts (a proportion of only 0.18%). We do not know exactly which artefacts Pei *et al.* called blades, but it is very possible that they refer to a few elongated flakes as blades. In any case, such small numbers cannot be taken as evidence of systematic blade production. Keates and Kuzmin are correct about the small discrepancies in tabulations. The number of endscrapers at CL5b (N = 1 now) of SDG 2 was updated and there is an error in CL3 (N = 1 now) in tab. 2 in our 2014 paper. The important point

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is, however, that these pieces cannot be attributed to an IUP toolkit. Endscrapers and burins are not exclusively diagnostic of the IUP but are also typical of the small-flake tool tradition in the Chinese Late Palaeolithic (around 40 ka–10 ka BP).

As for questions about chronology, we are in complete agreement with Keates and Kuzmin that the full corpus of dates from SDG 2 (and SDG 1) is confusing and difficult to resolve. This is due in part to the fact that samples have been collected by various teams over the years and their stratigraphic relationships are not always clear. Although there are some inconsistencies in our tabulations referring to the context of certain AMS dates at SDG 2, the dating samples that are cited (except for those published by Madsen *et al.*) were collected during the excavations from 2003–2007. These at least have clear relationships to the geological and archaeological stratigraphy. Some dates (BA110221, BA110224, BA110226 and BA110228) are aberrantly young. Overall, the OSL dates are more recent than the AMS dates from the same levels at SDG 2, and many are stratigraphically inconsistent. We have no explanation for this fact and it will certainly have to be addressed in future research at the site. Consequently, we relied more on the AMS dates to construct a preliminary chronology at SDG 2. Yet we did not choose to reject and accept ages purely as a matter of convenience: we have explained our rationale for accepting and rejecting specific age determinations. For example, as Keates and Kuzmin's fig. 2 shows, the majority of AMS dates from CL2 are quite coherent and make the age of this layer most reliable. Layers beneath CL2 cannot be more recent than layer CL2 itself, so we abandoned one date from CL5b (BA110227). Curiously, while the 'age-depth' model in Keates and Kuzmin's fig. 2 does highlight the problems with various dating results, it is, in itself, a poor tool for evaluating the ages of various layers at the site. For one thing, it assumes a constant and continuous rate of sediment accumulation, which cannot be assumed. Furthermore, we are not certain why they have anchored the lower end of the curve using OSL dates of L17 when they have rejected all other determinations using this method. Interestingly, their model would also predict an age of around 65 ka for CL7 and 42 ka for layer 5a, the layers in which the typical IUP artefacts were found. The former age at least is a good deal older than anyone would claim.

In fact, we are in agreement with Keates and Kuzmin when they reassert the value of Madesen *et al.*'s (2001) AMS dates from SDG 2. For as Keates and Kuzmin's fig. 2 shows, their dates are in very close agreement with dates from CL2 in the recent excavations, and Keates and Kuzmin seem to concur with us that both sets pertain to CL2. The problem with the rest of their thesis is, however, that these ages from CL2 do not relate to the IUP. As discussed in the publications cited, the very large collection from CL2 lacks any typical IUP artefacts or technological products, and instead represents a typical assemblage of the small-flake tool tradition. The only clear indications of IUP technology at SDG 2, sparse though they may be, come from much lower in the sequence (CL5a and 7) and so must be older than CL2.

Ultimately, ascertaining the age of the Levallois blade/IUP assemblages from the Shuidonggou site complex must await further research at SDG 1 because very little IUP material was found at SDG 2. The earlier age of IUP artefacts at SDG 2 provides at least some hypotheses to test. Indeed, other more recently reported dating results (Morgan *et al.* 2014; Nian *et al.* 2014) show that the age of presumed IUP levels at SDG 1 are consistent

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with the age that we proposed at SDG 2. Unfortunately, the poor stratigraphic control in earlier excavations leaves a degree of uncertainty in assigning even these new dates to particular cultural phases in the SDG 1 sequence. For example, these new studies reveal two age sequences at SDG 1: the sequence from the left wall of the old excavations is dated to 39–33 ka BP (Nian *et al.* 2014, fig. 3), whereas the middle profile is dated to 41–46 ka BP. This raises the possibility that different parts of the SDG 1 Palaeolithic deposit, lying at the same elevation, formed at different times.

Our work has attempted to clarify the age and nature of Upper Pleistocene archaeological assemblages in the Shuidonggou area, especially at SDG 2. Although they do make some valid observations, Keates and Kuzmin cloud the issues more than clarify them. Much more work is still needed at both SDG 1 and SDG 2, but two things are clear: 1) Madsen *et al.*'s dating results at SDG 2 do not represent the age of the IUP in the Shuidonggou area but pertain to a later kind of technology; and 2) the IUP in the Shuidonggou area is earlier than some may have expected. Many unresolved dating issues notwithstanding, what we have proposed is the most complete and detailed chronology available. At the same time it is also a provisional chronology, and we fully expect future work to modify it.

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References

Madsen, D.B., J. Li, P.J. Brantingham, X. Gao, R.G. Elston & R.L. Bettinger. 2001. Dating Shuidonggou and the Upper Palaeolithic blade industry in China. *Antiquity* 75: 706–16. http://dx.doi.org/10.1017/S0003598X00089213

Morgan, C., L. Barton, M. Yi, R.L. Bettinger, X. Gao & F. Peng. 2014. Redating Shuidonggou locality 1 and implications for the Initial Upper Paleolithic in East Asia. *Radiocarbon* 56: 165–79. http://dx.doi.org/10.2458/56.16270

Nian, X., X. Gao & L. Zhou. 2014. Chronological studies of Shuidonggou (SDG) locality 1 and their significance for archaeology. *Quaternary International* 347: 5–11. http://dx.doi.org/10.1016/j.quaint.2014.03.050

Pei, S., X. Gao, H. Wang, K. Kuman, C.J. Bae, F. Chen, Y. Guan, Y. Zhang, X. Zhang, F. Peng & X. Li. 2012. The Shuidonggou site complex: new excavations and implications for the earliest Late Paleolithic in North China. *Journal of Archaeological Science* 39: 3610–26. http://dx.doi.org/10.1016/j.jas.2012.06.028

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