Kostenki 12: palaeomagnetism and taphonomy

Palaeomagnetism

Two accounts so far have been given of the palaeomagnetic record at Kostenki 12, the first by Pospelova (2005) and the second by Pospelova, Anikovich, and Hoffecker (2005). They relate to two different seasons of investigation.

In 2002, Pospelova obtained 7 samples from 6 lithological horizons at the site (cf. Anikovich et al., 2004: 35). 4 of the samples showed normal polarity, but 3 did not. The sample from horizon 12 showed reversed polarity, and those from horizons 13 and 15 were anomalous (cf. Pospelova, 2005, Figure 3). All these horizons belong to the Lower Humic Bed. Pospelova remarked rather cautiously that a "geomagnetic excursion might have been recorded in the section" and her assumption was that this corresponded to Kargapolovo (Laschamp).

In 2003, 53 more samples (each of which was further subdivided) were obtained from the eastern section at the site. The samples were taken from lithological horizons 8-20, i.e., from the middle of the Upper Humic Bed down to the base. Pospelova observed that the scalar magnetic characteristics (SMC) of the samples differed considerably, and on this basis she constructed 11 distinct magnetic zones. The zones are shown in Pospelova et al. 2005 (Figure 10). This diagram shows, from the left, the magnetic zones, the lithological horizons to which they correspond, and the magnetic susceptibilities (K) measured against depth. As the author points out, the scale of the diagram differs in its upper and lower part, corresponding to magnetic zones 1-7 and 8-11 (lithological horizons 8-15 and 16-20, or samples 10-41 and 42-62). The need for two scales is explained by the fact that the figures for magnetic susceptibility are in general much higher in the upper part of the section than in the lower, although the individual magnetite grains (the main carriers of susceptibility) are larger in the lower part than in the upper. Concentration rather than size matters. According to Pospelova, SMC maxima occur in lithological horizons 8-9 and 12, and minima in horizons 10, 13, 15, 17, and 19. The maxima therefore coincide with humic loams and the minima with non-humic horizons. This is interpreted by her in climatological terms, the maxima and minima corresponding respectively to warmer and colder episodes (so-called thermomers and cryomers).

Pospelova goes further in claiming a correlation between these results and those obtained through pollen analysis. Figure 10 (Pospelova et al., 2005) shows Levkovskaya's results as first published to demonstrate this correlation (cf. Anikovich et al., 2004, Figure 11). Levkovskaya's diagram, as partially reproduced in Pospelova et al. Figure 10, shows, from left to right, the cultural layers, the lithological horizons (where the star corresponds to volcanic ash and A-D to the soil horizons recognised by Anikovich), the pollen results, and the palynoteratical ones. This diagram is reproduced by Levkovskaya herself in a somewhat revised form (Levkovskaya et al., 2005, Figure 1). Her thermostages correspond to lithological horizons 8, 12-13, 14, 16, 18-19, and 20, which still provides a fair degree of correlation with Pospelova's results. This is despite the fact that, as Pospelova remarks, Levkovskaya's samples were collected from the 2001 section, and not from the 2003 section which provided the basis for the palaeomagnetic reconstruction of events.

Taphonomy

Hoffecker et al. (2005) provide an analysis of a so-called bone bed found in cultural layer III (stratigraphic layer 12) in 2002. There was an unusually high concentration of bones in a 25 square metre area, in which horse and reindeer bones were prominent (Hoffecker et al., 2005, 162-163). Horse is usual for the site, but reindeer is not. The bone bed is about 20 cm thick, and probably represents two or more events. There are reasons for thinking that the majority of the horse bones may have belonged in the lower part of the layer, and the reindeer bones in the upper part, so they are temporally somewhat distinct. Most of the bones, which were disarticulated before burial, probably represent animals killed and butchered by humans. There are some traces of carnivore gnawing (probably by wolves) but the animals are regarded as “secondary consumers” of the carcasses. There are a few percussion marks on the bones, which are interpreted as damage caused by the use of stone tools. Artefacts were found in the vicinity. The orientation of the bones (predominantly NW/N) indicates that they were partially washed down the slope, perhaps as a result of a heavy rainstorm.

The representation of skeletal elements for horse and reindeer deviates from what would be expected for complete specimens. For example, there are no reindeer crania or mandibles. There can be a number of reasons for this, including post-depositional factors. Nonetheless, the bones present were analysed in terms of their food value or utility (FUI), the expectation being that at kill-butchery sites parts with high food value may be removed, while the reverse is expected at habitation sites. Statistically, no significant pattern could be detected at this site. Nonetheless, the authors point out that many parts with high food value are in fact rare or absent, so there could have been some selective removal here. Their conclusion is that the occupation debris found in this layer is consistent with a “pattern of short-term and limited activity use”. This is taken as having implications for the general interpretation of the site, and in particular for the Kostenki-Streletskaya culture which is represented in layer III. Another site which has been claimed as belonging to the culture is Sungir’, far to the north in the vicinity of Vladimir, where reindeer are also present. Since reindeer are migratory, the suggestion is that Sungir’ may have been the “warm season counterpart to Kostenki 12”. The sub-text therefore is that the Kostenki-Streletskaya variant may represent more of an activity facies than a culture, although this argument is not over-stated.

The analysis is revealing about the general environmental conditions which prevailed at the site. Macphail and Goldberg are quoted (but not cited) to the effect that the dark humic bands do represent episodes of in situ soil formation (thus supporting Anikovich’s position) whereas the carbonate lenses demonstrate deposition by spring water. The suggestion is that it was the presence of springs which led to the high concentration of Early Upper Palaeolithic sites at Kostenki in general. The Lower Humic Bed (of which stratigraphic layer 12 and cultural layer III form part) is said to constitute a “relatively mild interstadial”.

References

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Captions

Pospelova *et al*. (2005) Figure 10. Kostenki 12. The palynological and palynoteratical results (Levkovskaya's version 1) compared with the palaeomagnetic record. Two different scales are employed for the palaeomagnetic record in the upper and lower part of the deposits. In horizons 16-20 some of the smaller magnetised particles may have been removed by water action.

Levkovskaya *et al*. (2005) Figure 1. Kostenki 12, a comparison of the palaeomagnetic record with the palynological and palynoteratical results (Levkovskaya's version 2).

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20 September 2006