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Elevated Atmospheric CO_2 and Soil Biota

In their report "Impacts of rising atmospheric carbon dioxide on model terrestrial ecosystems" (17 Apr., p. 441), T. H. Jones *et al.* found that elevated atmospheric carbon dioxide (CO_2) alters the composition of soil fungi and Collembola, but has no effects on total microbial biomass and bacterial composition in model Ecotron ecosystems.

Plant production in many terrestrial ecosystems is nitrogen (N)-limited, and elevated CO_2 generally stimulates plant growth, carbon allocation below-ground and strengthens the plant N sink, intensifying plant-microbial competition for N in soil (*1*). Enhanced C inputs and reduced N availability in soil may result in a surplus of C relative to N and thus benefit fungi over bacteria (*2*), leading to a soil microbial community of greater fungal dominance (*3*).

Collembolan grazing of mutulistic, pathogenic, and saprophytic fungi may become more important in regulating microbial community structure and plant-microbe interactions (*4*) and potentially in feed-back to elevated CO_2 by modifying decomposition, nutrient cycling, and plant community structure. The results observed by Jones *et al.* may therefore be the result of C and N interactive controls on microbial community structure and activity resulting from elevated CO_2. These model ecosystems may thus reveal C- and N-mediated microbial feedback mechanisms important in natural ecosystems under elevated CO_2.

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References and Notes

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Geomagnetic Reversals

In their report "Lake Baikal record of continental climate response to orbital insolation during the past 5 million years" (7 Nov. 1997, p. 1114), D. F. Williams *et al.* present a sedimentary record of biogenic silica from Lake Baikal in Siberia. Magnetic polarity reversal data provided age control points that were used to arrive at a constant and continuous sedimentation rate of 4 centimeters per thousand years. In figure 1A of the report (p. 1115), a reference geomagnetic polarity time scale shows a number of short periods of normal polarity that do not appear in the references (*1*) listed in that figure. These periods appear to be based on the magnetic inclination record derived from the Lake Baikal samples, but are not shown in another publication related to the Baikal Drilling Project (*2*). "Events" at about 0.85, 1.2, and 2.4 million years ago appear to be the Kamikatsura, Cobb Mountain, and "X" subchrons, respectively (*3*). Normal events at about 1.55 and 2.03 million years ago do not appear in reference geomagnetic polarity time scales. The latter may argue for a split Reunion Event (*4*), although only a single event has been dated at 2.14 million years ago in the "type locality" (*5*).

The recognition and dating of subchrons in the time frame of about 3 million years ago to the present is of considerable importance for geological and stratigraphic studies, as well as for refining hypotheses relating to the origin of the Earth's magnetic field (*6*). Clarification regarding the reliability of these short events within the Matuyama reversed epoch, based on the magnetic studies of the sediments recovered from Lake Baikal, would be welcome.

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Response

We completely agree that the recognition and dating of subchrons during the last 3 million years has important implications for stratigraphic studies and for providing a better understanding of the origin of the geomagnetic field. For this reason, we represented the reference geomagnetic polarity time scale as complex (our original figure 1A). Although Brunhes chron excursions (*1*) are important for stratigraphic studies of Baikal sediment (*2*), they do not display well at the scale of our original figure 1A and therefore were omitted.The reference geomagnetic polarity time scale we displayed in our figure 1A is based on published data by others and not on the inclination data from Baikal sediment (figures 1B and 1C in our report). Because of referencing errors, the reader might have been led to believe that the short periods of normal polarity during the Matuyama chron were derived from Baikal samples. First, on page 1114, where figures 1A through 1C are mentioned, in addition to references (*1*) and (*3*) (numbers 29 and 30 in our report), two references were accidentally omitted. These references are for the subchrons at 1.55 million years ago (*4*) and 2.03 million years ago (*5*), respectively. The second error occurs on page 1115. In the text mentioning figure 1G and in the caption for figure 1G, the correct reference for the ODP-846 data is (*6*) (number 43 in our report), not (*3*) (number 30 in our report). Also, in the caption of our figure 1A, the correct references are (*1*), (*3*), and the two omitted references (*4, 5*), not reference (*6*) (number 43 in our report).

Age (my)	BDP-96 hole 1 (m)	BDP-96 hole 2 (m)
0.78	34.27	33.87
0.99	43.36	42.71
1.07	47.00	47.05
1.77	71.63	71.76
1.95	77.76	77.85
2.58	104.77	
3.04	117.95	
3.11	121.42	
3.22	124.37	
3.33	127.50	
3.58	143.80	
4.18	166.32	
4.29	170.84	

Table 1. Geomagnetic polarity age model for Baikal Drilling Report (BDP)-96 sediment as shown in figure 1D of the original report.

An initial inclination profile was measured from pilot samples collected from the base of each core (*7*). This initial geomagnetic record was used to plan the sampling strategy once the cores were split. A more detailed inclination profile, based on subsamples obtained from the split cores, appeared in our report with more detailed subchron structure.

Within the Matuyama chron, the Jaramillo and Olduvai subchrons were used to develop the polarity age model (our original figure 1D), whereas the other Matuyama subchrons were not used. The 13 age-depth control points plotted in our figure 1D are presented here in Table 1. Continuing studies of Baikal sediment will allow the application of geomagnetic reliability criteria (*8*) to determine if the short-duration Matuyama subchrons can be used to provide additional age control.

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