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Evidence of global pollution and recent environmental change in Kamchatka, Russia

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Abstract

Kamchatka is a remote, isolated and understudied area and is presumed to be pristine. Here we present the first high-resolution palaeolimnological investigation of the recent past. A short core representing the last 250 years was taken from Olive-backed Lake situated in central Kamchatka. Lead-210 dating revealed that sediment accumulation has increased at the site since the 1960s and may be related to greater rates of catchment erosion associated with wetter winters in the region. Mercury and spheroidal carbonaceous particles (an unambiguous indicator of fossil fuel combustion) concentrations are low but clearly detectable indicating that both regional and global pollution sources are observed at this site. The recent increase in the flux of mercury is more related to catchment sources and catchment erosion than increases from regional or global sources. The diatom and chironomid populations are stable and do not show any statistically significant changes related to either the low levels of pollution, or to temperature and precipitation changes. The lake is not pristine since anthropogenic contamination has occurred but since there have been no significant effects on the flora and fauna the lake can be considered to be unimpacted. Olive-backed Lake may be a suitable reference site to benchmark the natural variability of a lake ecosystem.

Keywords: Kamchatka, pollution, diatom, chironomid, mercury, spheroidal carbonaceous particles

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