

Reconstructing Late Pleistocene – Holocene mid-latitudes atmospheric ^{36}Cl production rates derived from fossilized Packrat Urine

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Abstract

This research is aimed at reconstructing a millennial scale production rate of cosmogenic atmospheric ^{36}Cl in mid-latitudes for the time interval of the LGM – early Holocene. The ^{36}Cl record is derived from crystalized packrat urine deposited in numerous previously dated packrat middens distributed throughout the western USA and Mexico. Previous results from crystalized packrat urine show a significant shift in $^{36}\text{Cl}/\text{Cl}$ between the LGM and the early Holocene. Though, large scattering and problematic pre-assumptions combined with low resolution for the period under investigation make it difficult to assess whether the shift in $^{36}\text{Cl}/\text{Cl}$ is a real shift in ^{36}Cl production, or whether it is a byproduct of an environmental change. In this research, we will improve the resolution of the $^{36}\text{Cl}/\text{Cl}$ record by sampling multiple previously dated middens spanning the LGM – early Holocene, and by sampling only single layered middens to avoid post depositional affects. Furthermore, we will evaluate the current range of $^{36}\text{Cl}/\text{Cl}$ in local desert vegetation and soil to assess the possible role of an environmental shift on the $^{36}\text{Cl}/\text{Cl}$. This record will help determine to what extent the $^{14}\text{C}/\text{C}$ decline in the B-A and mystery interval could have been caused by a reduction in the cosmogenic production rate.