

First report of Paleocene amber from Estevan, Canada—geochemistry and inclusions

Amber's chemical structure has allowed for the excellent preservation of both primary isotope signatures and fossil arthropods. Amber deposits are poorly represented during the latest Cretaceous and throughout the Paleocene. This lack of data hinders our understanding of how insects and other terrestrial organisms with low preservation potential performed across the end-Cretaceous extinction event. Here we present a newly discovered amber deposit in the Estevan coalbeds (Ravenscrag Formation, Paleocene, ~62 Ma) of Southern Saskatchewan. This new deposit helps fill in the Cretaceous–Paleogene Amber Bioinclusions Gap (72.1–55 Ma). Four coal seams are found at the site, three are amber producing, and currently only one has produced amber with bioinclusions. Several botanical and arthropod inclusions found represent some of the earliest Paleocene insects in amber, demonstrating the potential to uncover important evolutionary information for this time with additional collection and preparation. The deposit is also characterized using stable isotopes of carbon and hydrogen ($\delta^{13}\text{C}$ and δD), and Fourier-Transform Infrared (FTIR) spectroscopy. $\delta^{13}\text{C}$ values suggest the amber producing tree was stressed. δD values from amber indicate a significant coastal influence during the Early Paleocene, likely recording the receding Western Interior Seaway. FTIR results allow chemical comparisons to modern resins and indicate the resin source to be Cupressaceae conifers. This multi-proxy approach of ecosystem reconstruction provides a vital window into arthropod recovery after the K–Pg extinction event and the conditions they persisted in. Future work will examine an additional (~64 Ma) section in Southern Saskatchewan, near the K–Pg boundary, to investigate wider ecological changes during this time.

Katie Kreutzer biography

Katie is in her final year of undergraduate studies at the University of Regina, pursuing a B.Sc. Hons. majoring in Geology. She has been an NSERC student researcher in the Department of Earth Science since 2023, researching a variety of topics, including amber isotopes and inclusions in southern Saskatchewan. This project, which has expanded into her undergrad thesis, is supervised by Dr. Ryan McKellar, Dr. Maria Velez, and Dr. Leslie Robbins at the Royal Saskatchewan Museum and University of Regina. Katie hopes to continue combining geochemistry and paleontology by pursuing an M.Sc. in Geology in the Fall of 2026.