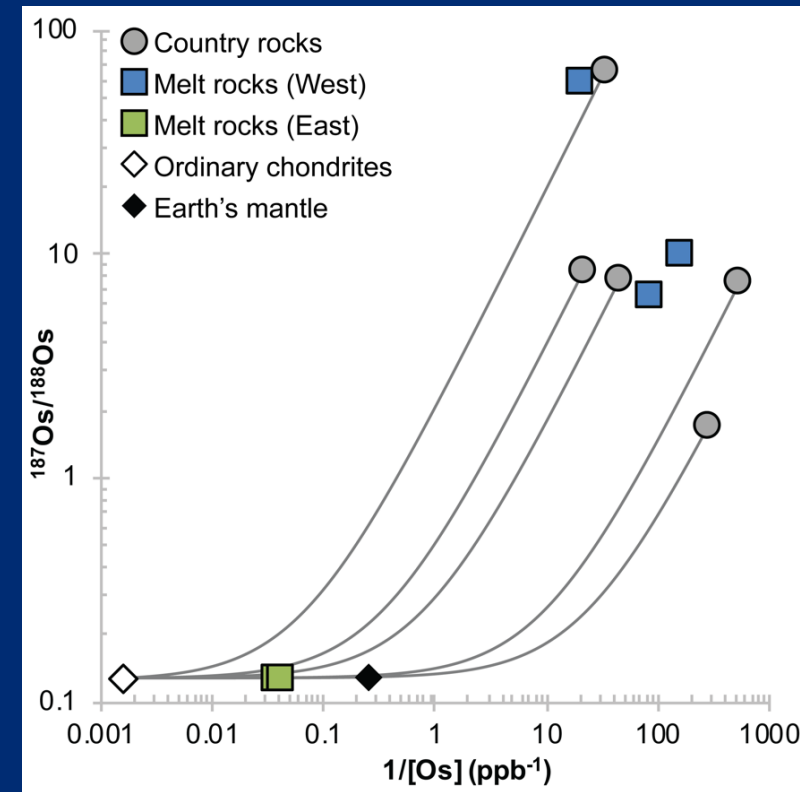


The curious case of a missing meteoritic signature



Most of Earth's impact craters have geochemical or isotopic traces of the asteroids that formed them. Earlier studies failed to find such a signature at West Clearwater but detected a massive 8% meteoritic material in impact melts from East Clearwater. (Impact melts at most craters contain meteoritic material, but $\ll 1\%$.)

Two impact craters in Canada formed in nearly identical targets have starkly different meteoritic signatures. One crater has one of the strongest levels of meteoritic contamination ever recorded in terrestrial impact melts. The other crater lacks even the faintest whiff of meteoritic material.



We used precise osmium isotope measurements to revisit the meteoritic signatures of these craters. Surprisingly, our much more sensitive search with a wider sample suite found no evidence for meteoritic material at West Clearwater. An unusual impactor type may have been responsible for this crater. Melt samples

from East Clearwater plot on the solid lines, which show two-component mixing between ordinary chondrites and Clearwater country rocks. This indicates a strong chondritic component at East Clearwater, consistent with the results of previous work.