

# **Major and minor elemental analyses of distal channel deposits from the Late Devonian marine Alamo Impact Event**

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## **ABSTRACT**

**This study determined the geochemical signal—major and trace element composition as well as a potential extraterrestrial component, iridium—of distal, onshore channel deposits of the Alamo Breccia. The Breccia formed by the early Late Devonian—early Frasnian, ~382 Ma—Alamo Impact Event, which was centered in an oceanic off-carbonate platform site in south-central Nevada. Twenty-eight samples were analyzed—sixteen from the Alamo Breccia channel deposits and twelve from above and below—as a representative of the Alamo Impact Event stratigraphy. The Breccia shows a wide range of concentrations in major, trace and rare earth elemental compositions, yet this same range is present, but in significantly lower concentrations, in normally deposited pre- and post-event carbonate layers below and above the Breccia. Results clearly indicate an iridium (Ir) anomaly—peaking at 190 ppt—as well as relative enrichment in other siderophile elements (Co, Ni, Au and Fe), chromium, and rare earth elements from within the Breccia. For the most part, the enrichments within the Breccia can be attributed to its greater siliciclastic component—from greater mud/clay and quartz sand contents—compared to carbonate rocks below and above. However, the high relative abundance of Ir in the Breccia far exceeds Ir concentrations expected solely from increased siliciclastic input, and is consistent with Ir values previously reported from other proven impact-related deposits. The Alamo Ir data are therefore interpreted to give additional supporting evidence for the impact origin of the Alamo Breccia channel deposits.**