

GSA Connects 2022 meeting in Denver, Colorado

Paper No. 200-7

Presentation Time: 2:00 PM-6:00 PM

USING SEDIMENTOLOGY AND HIGH-PRECISION GEOCHRONOLOGY TO ASSESS RECURRENCE RATES OF EXPLOSIVE VOLCANISM IN PALEO-EQUATORIAL PANGAEA

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The peak of explosive volcanism in the late Paleozoic occurred ca. 300 Ma in eastern equatorial Pangaea where widespread calc-alkaline (andesitic-rhyolitic) magmatism accompanied syn-orogenic collapse of the Variscan belt (eastern Central Pangean Mountains). Several small rift basins (0-5°N paleolatitude) also formed throughout west-central Europe during Variscan collapse, resulting in segmented but well-preserved records of sedimentation with intercalated volcanics. In the Massif Central, south-central France, the continental Brousse-Broquiès basin preserves a single well-exposed section (~60 m) of Upper Carboniferous pyroclastic-volcaniclastic lacustrine strata, which lacked age constraints prior to this work. Here, we present preliminary data including the detailed (cm-scale) sedimentology of the La Mine section and high-precision U-Pb geochronology. The primary facies include (1) bedded chert with abundant soft-sediment deformation, tuff, and lapilli, (2) ~70 fissile bentonites, and (3) laterally variable beds of moderately-to-poorly sorted, tuffaceous silt-sandstone. Analyzed zircon grains from bentonite layers at the base and top of the section yield Kasimovian ages that are resolvable outside the analytical uncertainties and are ca. 400 kyr apart, defining a volcanic recurrence interval of <10 kyr. This is the first quantification of upper Carboniferous volcanic recurrence, and a unique opportunity to gain insight into the nature of frequent and highly explosive silicic volcanism that was occurring across many analogous volcanic centers of eastern equatorial Pangaea during the peak of the late Paleozoic icehouse. Though these data emanate from a single site, extrapolation to analogous and contemporaneous (previously documented) sites throughout western Europe illuminate the impacts of volcanism on the climate system of Earth's most prominent pre-Cenozoic icehouse. Perhaps the late Paleozoic world saw some of the most abundant and frequent stratospheric injections of sulfate aerosols in Earth's Phanerozoic history. The integrated approach (detailed stratigraphy, sedimentology, and high-precision geochronology) followed here for quantifying volcanic recurrence rates are applicable in analogous deep time studies.

Session No. 200--Booth# 72

[D8. Recent Advances in Geochronology \(Posters\)](#)

Tuesday, 11 October 2022: 2:00 PM-6:00 PM

Exhibit Hall F (Colorado Convention Center)

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