

Poster 8      Episodic Felsic and Mafic Magmatism and the Growth of Southern Laurentia

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The basement of the mid-continent documents voluminous, episodic magmatism that is a key component in the development of southern Laurentia. Recent U-Pb zircon ages, isotopic analysis, and seismic interpretations reveal a complicated history that involves at least four major magmatic events and at least two periods of basin development from 1.47 to 1.07 Ga. The granite-rhyolite province can be divided into separate periods of magmatism at ~1.47 and ~1.37 Ga, and similar rhyolites in the Carrizo Mountain Group extend the age range to 1.33 Ga. Sm-Nd isotopic signatures indicate that these magmas had similar source regions. From 1.28 to 1.22 Ga, a broad, carbonate-dominated shelf extended from the Texas Panhandle south to Van Horn and from the Llano Uplift to the Grand Canyon regions. Associated mafic magmatism was common, along with episodic rhyolite ash falls. A possible source for the rhyolite is exposed in the Burro Mountains of southwestern New Mexico.

Renewed bimodal magmatism began at about 1150 Ma; it followed deposition of >500 m of quartz-rich sandstone of the Lanoria Fm. This magmatism lasted until ~1070 Ma and was characterized by tholeiitic basalt and alkaline ("A-type") rhyolite/granite, all typical of extensional settings. Magmatic rocks of this age underlie at least part of the Abilene gravity minimum, the central basin platform, the TX Panhandle, and the Franklin Mountain region. In places seismic reflection data image basins within basement that may be filled with Mesoproterozoic volcanoclastics. Reflection data also show that reflectors within basement interpreted to be crosscutting mafic sills are common. Evidence of the northwest directed Grenville collisional event is apparent in the deformed nature of rocks located in the southern most part of the Laurentian continent.