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Large Igneous Province: Cambrian Diabase Dikes, Eastern Arbuckle Mountains, Oklahoma.

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A swarm of Cambrian diabase dikes intrude the 1400-1365 Ma granitoids of the eastern Arbuckles. The dikes strike predominantly N60°W, parallel to the rifted margin of the southern Oklahoma aulacogen and are related to Cambrian opening of that structure. The diabases are olivine-hypersthene-normative to hypersthene-quartz normative and consist mainly of basalt with minor basaltic andesite and andesite. Their tholeiitic character is further indicated by low TiO_2 and P_2O_5 contents, low Nb/Y ratio, and variable Zr/P_2O_5 ratio. Mg numbers of 52-36 are indicative of derivative basaltic liquids which are consistent with the fine-grained, equigranular mineral assemblage of plagioclase + augite + Fe-Ti oxides $\pm$ olivine of most diabases.

The timing and tectonic setting of the diabases strongly suggest that they were intruded in association with the break-up of the southern Laurentian supercontinent in early Cambrian time. These dikes testify to the probable existence of a break-up of a large igneous province (LIP) in this region and demonstrate that Cambrian LIPs were compositionally similar to better-known break-up LIPs of Mesozoic and younger age. This occurrence is the only evidence that we can find for the presence of a LIP break-up in southern Laurentia, but we argue that compositional similarities with other, better preserved LIPs warrant the conclusion that the Cambrian LIP break-up of the southern mid-continent was similarly extensive.