

**EMPLACEMENT AND DEFORMATION OF LATE SYN-OROGENIC,
GRENVILLE-AGE GRANITES IN THE LLANO UPLIFT,
CENTRAL TEXAS**

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During the waning stages of Grenvillian orogenesis, voluminous, 1126 to 1070 Ma granitic plutons intruded Mesoproterozoic rocks of the Llano Uplift, central Texas. Previously the granites were believed to be "anorogenic," but this study has demonstrated that they are late syn- to early post-tectonic intrusions. These granites can be divided into two categories on the basis of intrusion morphology, intrusion mechanism, relation to deformation, and their ages.

Intrusions of the first category are elongate to irregular in shape, have passive intrusion mechanisms related to folding or shearing, are commonly deformed, and apparently are older. Intrusions studied in detail include the Wolf Mountain intrusion, the Grape Creek pluton, and the Midway sill.

The Wolf Mountain intrusion is a chevron-shaped granitic body that occupies the hinge of a large SE-plunging syncline. This sill-like body intruded and cooled to subsolidus conditions during folding. One foliation is magmatic and folded, whereas another is axial planar to the fold and has a solid-state component. Folding while the intrusion was not completely crystallized has resulted in complex internal structures in the hinge.

The Grape Creek pluton is cut by a 400-meter wide shear zone where isotropic porphyritic granite has been transformed into an augen gneiss with zones of mylonite. This shear zone shows top-to-the-SW sense of shear. Relatively undeformed dikes cut the shear fabric, indicating most deformation had ended before the intrusion has completely cooled.

The Midway sill has been sheared into an augen gneiss with kinematic indicators showing top-to-the-NW motion. Early dikes that intrude the country rock are deformed whereas late dikes are undeformed, showing deformation was syn-intrusion.

Intrusions of the second category are large circular to oval-shaped granitic bodies. These intrusions have features normally associated with forceful intrusion, concentric zoning, margin-parallel foliations, folds of the wall rock with contact-parallel fold axes, and, in some cases, vertical shear along the contact. These oval-shaped granites are younger, and are now considered to be early post-tectonic not anorogenic.

Deformation and intrusion of the granites was synchronous with a widespread low pressure metamorphism in the Llano Uplift. This low-pressure event shows both a dynamic and a static component.