

JOINT SYSTEMS AND THEIR POTENTIAL INFLUENCE ON GROUNDWATER IN THE LITHONIA–CONYERS AREA, GEORGIA

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Abstract. Joint systems developed in the massive Lithonia Gneiss in the Lithonia–Conyers area in eastern Metropolitan Atlanta, Georgia (Fig. 1) may locally influence the flow and movement of groundwater in the underlying crystalline bedrock. In quarries, outcrops, and wells, these fracture systems almost always occur in zones of joint concentration separated by either poorly jointed or unjointed rock. In most parts of this study area, the joints have a fairly consistent orientation (Fig. 2) and, where concentrated, appear to influence drainage patterns. In quarries, groundwater is commonly observed seeping

along zones of joint concentration and moving downward into the subsurface; this substantially influences weathering along these zones and, in turn, contributes to valley development. Slickensided joints (small faults) also occur in local quarries; these occur in systems of en-echelon, moderately-dipping fractures that may be part of larger brittle fault zones. Additional focused study of joint and fracture systems, along with mapping of lithologies and foliation trends, may be useful in better understanding groundwater resources of the area.

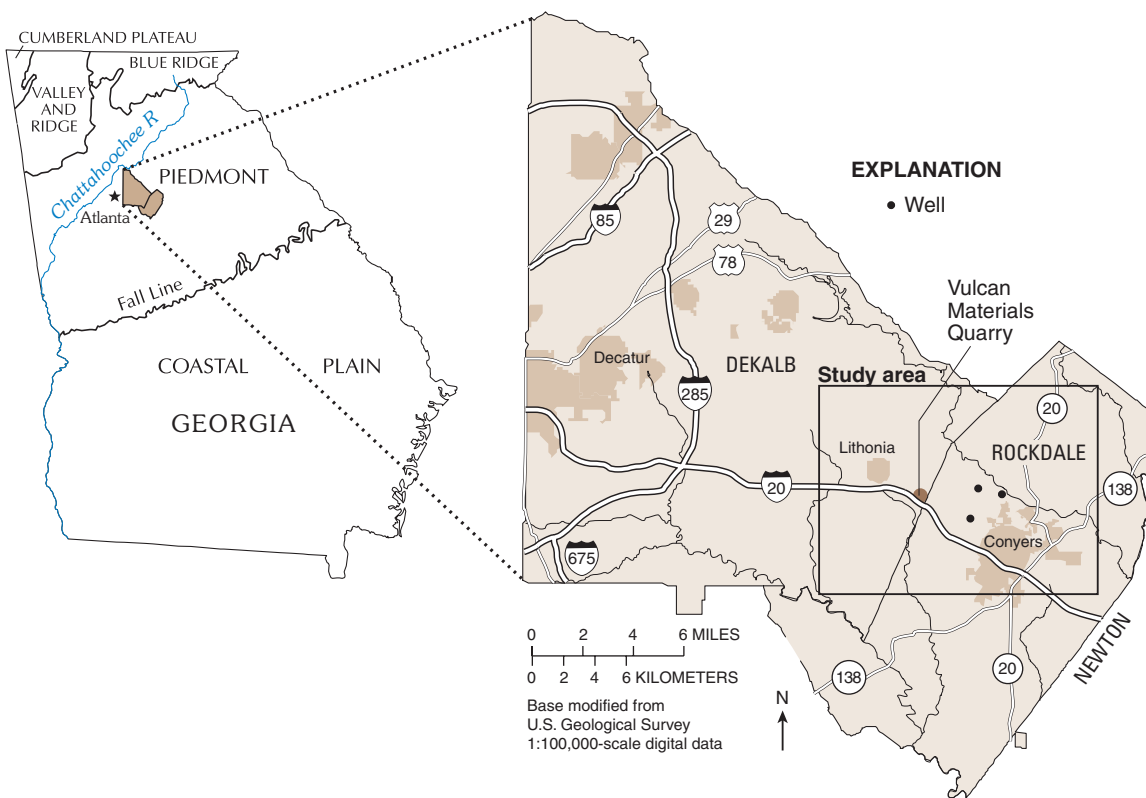
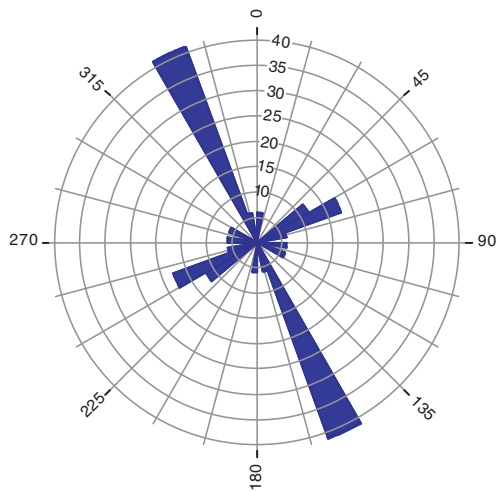
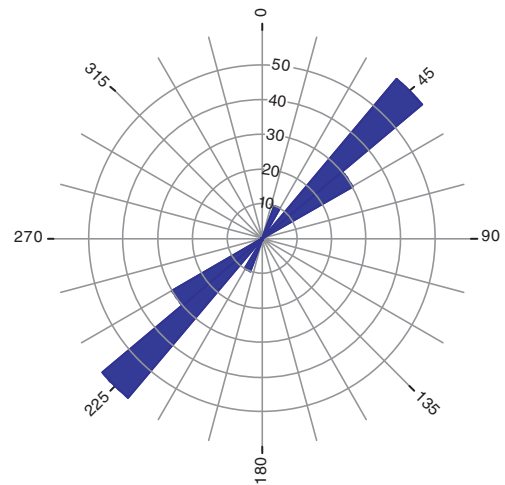


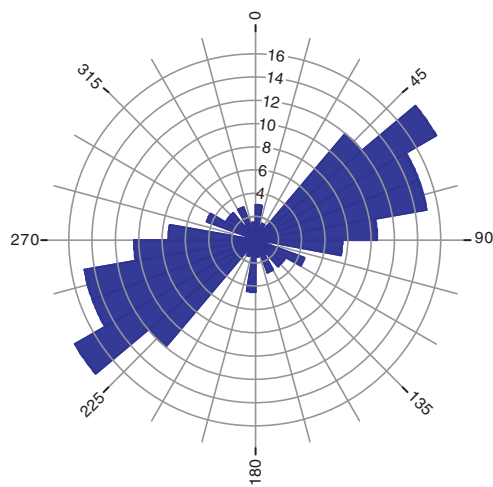
Figure 1. Location of study area in the Lithonia–Conyers area, Georgia.



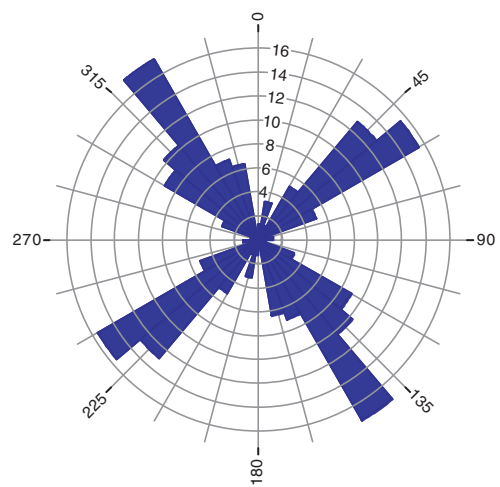
A. Joints in Vulcan Lithonia Quarry (dips range from 40 to 90 degrees)



B. Slickensided joints (faults) in Vulcan Lithonia Quarry (dips range from 40 to 62 degrees)



C. Subsurface joints measured in three wells in Rockdale County (dips range from 31 to 88 degrees)



D. Linear stream segments in the Lithonia-Conyers area

Figure 2. Bidirectional rose diagrams showing the trend of (A) joints and (B) slickensided joints (faults) measured in the Vulcan Materials Company Lithonia Quarry, (C) subsurface joints measured in three wells penetrating Lithonia Gneiss, and (D) linear stream segments in the Lithonia-Conyers area, Georgia.