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GEOMETRY OF THE TRACHYTE MESA INTRUSION, HENRY MOUNTAINS, UTAH, AS DETERMINED BY AN INTEGRATED GEOPHYSICAL AND STRUCTURAL INVESTIGATION

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The Trachyte Mesa intrusion is one of several small satellite bodies to the larger intrusions making up the Henry Mountains of southern Utah. Both G.K. Gilbert and C.B. Hunt identified Trachyte Mesa as a laccolith, a lens-shaped intrusion with a domed roof. Recent studies of the intrusion have supported this conclusion. During a recent summer field course conducted by the Dept. of Geology at USF we sought to define the geometry of the intrusion. Combining magnetic, resistivity, and structural field data, we can now resolve the geometry of the Trachyte Mesa intrusion with great detail.

The geophysical investigations focus on the southwestern portion of the intrusion where it is largely concealed by overlying strata and Quaternary fluvial deposits. Over 30,000 magnetic readings were collected in this portion of the sill. These data reveal >1,000nT anomalies that clearly delineate the outline of the buried intrusion, which is roughly double the outcrop area. Multichannel resistivity soundings of the intrusion confirm a depth of 6-12 m to the top of the sill, and that the sill top, where buried, is lower in the center than along the northwest or southeast margins.

Structurally, the Trachyte Mesa intrudes a series of northeast-trending upright and open folds formed within the Jurassic Entrada Fm. To the northwest of the intrusion we mapped two sets of folds with an average wavelength of ~400 m. The majority of the intrusion, therefore, is emplaced into a syncline and does not extend to the hinge of the anticline on the southeast, but does locally overtop the hinge of the anticline to the northwest. Space for the intrusion was made through the uplift of a capping, coarse grained sandstone member of the Entrada Fm. This was accommodated within the overlying strata, in part, by shearing along subvertical joint surfaces.

The geometry of the intrusion is 2.2 km long, 0.7 km wide with an average thickness of ~15 m (max. ~40 m). In cross-section, however, it is characterized by concave up top and bottom surfaces, except along the part of the northwestern margin where it overtops the hinge of an anticline. The long dimension of the intrusion parallels the trends of the fold into which it was emplaced. These observations suggest that the preexisting structure may have played a significant role in the emplacement of the Trachyte Mesa intrusion.

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