“Teardrop” structures of the Nepewassi domain in the Central Gneiss Belt of the Grenville Province, Ontario

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The Nepewassi domain, dominantly composed of Archean to Paleoproterozoic gneisses, lies within the Central Gneiss Belt of Ontario. The Nepewassi also contains plutonic groups from two magmatic events at ~1400 Ma and ~1200 Ma, respectively. A link between the metamorphism and deformation of the gneiss, the two magmatic groups, and the ~1100 Ma Grenville orogeny is probable. The target area of this study is a “teardrop” structure near the West Bay of Lake Nipissing, Ontario, within the Nepewassi domain. The structure is visible from air and satellite imagery and is of interest because it may help explain the deformation patterns in deep crustal rock during the Grenville orogeny. The teardrop is ~3 km across the long axis, ~2 km across the widest short section, and trends ENE, pinching in this direction. It is composed of several concentric ridges and valleys formed by foliation of the local ~1200 Ma granite and older gneiss. Rock samples from the area include foliated and megacrystic pink granite, gray gneiss, and lensoid amphibolite. The structure lies within a domain of gently dipping, highly strained gneiss with open, ESE trending folds. High strain fabrics occur throughout as well as widespread migmatitic textures. The structure is separated from irregular Archean gneiss to the N by a steep shear zone striking WNW. Foliation dip in the teardrop has a bimodal distribution, with one set shallowly dipping SSW and another dominant set dipping NNE. It is reasonable to propose that Grenvillian deformation began with formation of the high strain gneissosity accompanying thrusting and recumbent folding followed by upright folding. Interference between the first and second fold types would explain the bimodal distribution of fabric orientations seen within the teardrop structure as well as the surrounding domains.