New insights into the geology of a Late Neoproterozoic igneous complex in the Avalon Zone, Newfoundland

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In the Avalon Zone of Newfoundland, the recently recognized Horse Cove Complex occurs along the east coast of Conception Bay on the Avalon Peninsula. New detailed mapping explores the geology of the Horse Cove Complex and its role in the tectonic history of the Avalon Zone. This mapping is supported by petrography, major and trace element geochemistry and U-Pb geochronology on 4 key rock units. Within the Horse Cove Complex, granite, feldspar porphyry, diorite and metavolcanic/metaplutonic mafic rocks host a swarm of mafic to felsic dykes. Granite occurs as septa between mafic dykes and metavolcanic/metaplutonic mafic rocks, and larger granite blocks host mafic dykes. Since it appears to be the oldest unit in the map area, a U-Pb age for the granite provides the lower age limit for the Horse Cove Complex. Feldspar porphyry and diorite also occur as septa and are locally hosts to mafic dykes, and seem to be older than metavolcanic/metaplutonic mafic rocks. The relative ages of feldspar porphyry and diorite and their age relationships to the granite cannot be proven by field relationships. Geochemistry and U-Pb ages of feldspar porphyry and granite will be compared to test their relationship. Mafic and felsic dykes represent the youngest magmatism in the map area and several generations of mafic dykes are further subdivided according to petrography and geochemistry. The two apparently youngest rocks are: (1) a rhyolite dyke that cross-cuts feldspar porphyry, diorite and metavolcanic/metaplutonic mafic rocks and; (2) a dyke of intermediate composition that cross-cuts several mafic dykes. U-Pb ages for these two dykes provide the younger age limit for magmatism in the Horse Cove Complex. The U-Pb ages of the youngest dykes and the oldest country rocks bracket the known magmatic history of the Horse Cove Complex, and, together with geochemistry and petrography, will permit correlations with other magmatic events in the Avalon Zone.

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