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THE WESTERN WABIGOON SUBPROVINCE, SUPERIOR PROVINCE, CANADA: LATE ARCHEAN GREENSTONE SUCCESSION IN RIFTED BASEMENT COMPLEX.

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The Wabigoon Subprovince, interposed between the predominantly metasedimentary-plutonic and gneissic English River and Quetico Subprovinces to the north and south respectively, exposes Archean greenstone and granitoid rocks for a strike length of greater than 700 km. Based on predominating rock types, the western part of the subprovince is divided into two terranes: the northwestern Wabigoon volcano-sedimentary and plutonic terrane (NWW) and the Wabigoon Diapiric Axis terrane (WDA)(1).

NWW in Ontario extends southwesterly from Savant Lake to Lake of the Woods. Organized searches for older and younger age limits for the evolution of this terrane, yield reliable zircon U-Pb ages for supracrustal strata that span from 2755 Ma to 2711 Ma, although most ages are between 2720 Ma and 2734 Ma (2,3,4,5,6,7). The lowermost volcanic sequence in the western part of NWW is bimodal Mg-rich tholeiitic basalt and rhyodacite at Thundercloud Lake (2755 Ma); later, at 2734 to 2718 Ma, bimodal Fe-rich tholeiitic basalt and rhyodacite (Dash Lake) is attended by bimodal basalt and tonalite plutonism. This stage overlaps with intermediate to felsic calc-alkaline volcanism (Kakagi Lake). The latest volcanism in the sequence at 2711 Ma is dacite at Stephen Lake (3,7) which is conformable with the subjacent Kakagi Lake strata and as such gives an upper limit for the age of major tectonism affecting the supracrustal rocks.

WDA is a 400 km long by 75 km wide domal structure which consists of 1) gneissic tonalitic to granodioritic rocks forming domes and lesser massive segregations, 2) crescentic dioritic to granitic plutons occurring at or near the contact between the gneiss domes and the Wabigoon supracrustal rocks, and 3) later plutons of diorite to granite (1,8,9). U-Pb geochronology indicates that at least some of the eastern part of the terrane, which extends from Steep Rock Lake in the south to Caribou Lake in the north, has some old (approx. 3.0 Ga) gneissic and supracrustal rocks (10). The western part of WDA, so far has not yielded old ages; gneissic to massive tonalitic rocks have intrusive ages of 2720-2725 Ma (3,7,9). At least some of the gneissic tonalite forming the domes in the western part of WDA have ages similar to, and in the field are gradational with, tonalite plutons intruding NWW. A sphene U-Pb age of 2674 Ma for gneissic tonalite with a zircon U-Pb age of 2723 Ma suggests that the gneissification was a late event involving the resetting of the sphene age but that the age of intrusion was retained by the zircon. The crescentic and later plutons dated so far have ages near 2700 Ma (3,7,9) and do not have regional foliation thus providing an approximate lower limit for the age of major tectonism in the terrane.

NWW is interpreted to have formed during rifting of a basement complex that underlies the adjacent English River

Subprovince (11) and the western part of NWW and WDA. The complex is approximately 3.0 Ga old and perhaps older. The rifting started with mafic magmatism which evolved to be bimodal basalt-rhyodacite. Tonalite intrusions accompanying the bimodal volcanism caused little or no deformation of the adjacent supracrustal rocks (12). Much of the contemporaneous calc-alkaline sequence may be from mixing of basalt and tonalitic magmas. The age of major deformation in the supracrustal rocks may be bracketed by the age of the uppermost (and conformable) Stephen Lake dacite at 2711 Ma and the age of the posttectonic plutons at approximately 2700 Ma. Heating of the lower crust by ponding of mafic magma caused most of the deformation of both the younger Wabigoon 'rift' sequence and the basement complex; WDA is the scar of maximum crustal diapirism transecting the new and old crust.

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