

HIGHLIGHTS

- the area has good potential for the discovery of new deposits in part of the Abitibi greenstone belt with extensive overburden and relatively minor past exploration
- base metals exploration should be focused on newly identified volcanic stratigraphic units with similar ages, lithologies and mineral occurrences to past producing mines along strike in Quebec
- gold exploration should be focused along major ductile deformation zones where older volcanic units have been thrust southerly over younger sedimentary units

Gold and Base Metal Potential of the Detour-Burntbush Area

The northwestern portion of the Abitibi Greenstone Belt (AGB) represents an important area for future exploration for base metal and gold deposits. In general this area has extensive overburden cover and thus outcrop information is limited. In spite of this drawback, the mineral potential is good with a number of significant past and currently producing deposits (e.g. Detour Lake, Casa-Berardi, Selbaie, Normetal, etc.). It is therefore important to compare and contrast the known stratigraphic, metallogenic and structural evolution of the north with the remainder of the AGB to help outline areas of high prospectivity. One such area is the Detour-Burntbush area (Figure 19). This part of the AGB has been the focus of a number of new geoscientific projects under TGI-3 and the Discover Abitibi Initiative in order to improve our understanding of its metallogeny and to aid exploration. The projects include: a newly released 1:100 000 compilation map including new geochronology and lithogeochemistry; two newly released high resolution aeromagnetic surveys covering the Burntbush and Detour areas respectively; ongoing Quaternary mapping and till geochemistry, and an anticipated project of detailed bedrock mapping, stratigraphy, structure and metallogeny in the southern Burntbush area.

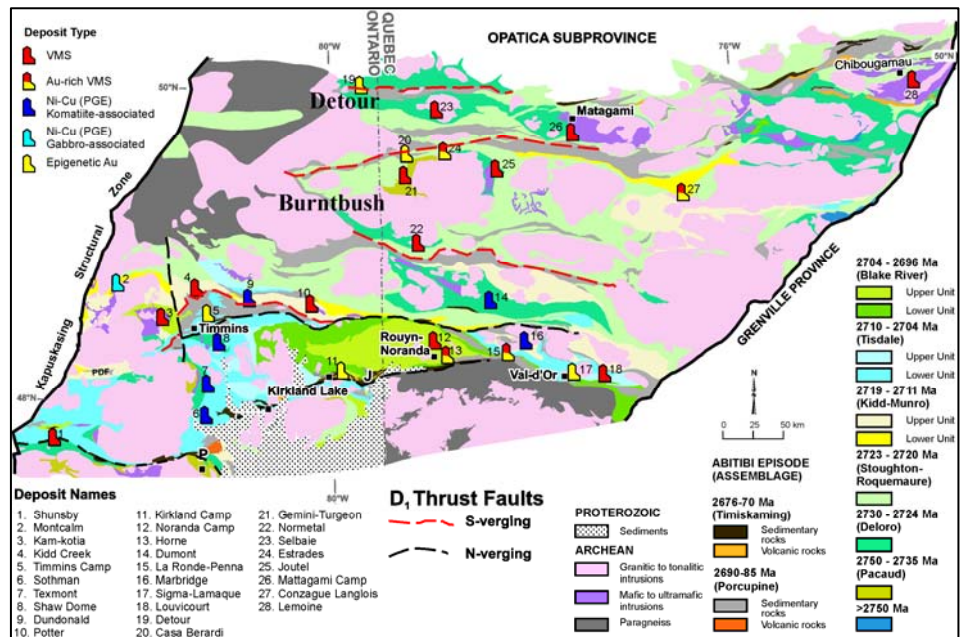


Figure 19: Stratigraphic map of the Abitibi greenstone belt.

VMS-bearing Stratigraphy

Results from 12 new geochronological samples (Figure 20) have greatly improved our understanding of the stratigraphy of the Detour-Burntbush area which now permits better correlation within the AGB stratigraphic framework and with known ages on the Quebec side of the border. The volcanic rocks in the northwest belong to three of the oldest volcanic episodes of AGB; identified as the Pacaud (2750-2735 Ma), Deloro (2734-2724 Ma) and Stoughton-Roquemaure (2723-2720 Ma) assemblages (also identified as volcanic episodes with similar age ranges in Figure 19). All three of these assemblages contain VMS deposits and VMS-style mineralization in the NW AGB (Figure 19).

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Gold and Base Metal Potential of the Detour-Burntbush Area

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Epigenetic Gold

As is true for the whole of the Abitibi, structurally-controlled gold deposits in the NW AGB are genetically and spatially associated with major deformation zones. These fault zones were the locus of repeated strain increments resulting in broad easterly-trending, ductile deformation zones with kinematics commonly indicating a long-lived and complex deformation history. Where kinematic studies have been done, they typically show early dip-slip displacement associated with north-south compression followed by sinistral and/or dextral displacement associated with various transpressive events. Recent geochronological and structural studies at the Detour Lake Mine show that the Sunday Lake deformation zone (SLDZ) represents a north-dipping D1 fault in which Deloro-aged volcanic rocks were thrust southerly over clastic sedimentary rocks of the Porcupine assemblage (ca. 2690 Ma). Subsequent strike-slip deformation events overprint D1 with both dextral and sinistral asymmetry. Gold mineralization occurs in the hangingwall to the SLDZ in both narrow high grade zones at the contact between ultramafic and mafic volcanic units and also as broad bulk tonnage lower grade zones in the structurally overlying mafic flows.

The Casa-Berardi deformation zone (CBDZ) hosts the Casa-Berardi gold mine and extends westward across the northern Burntbush area (Figures 19 & 20). Structural studies at the Casa-Berardi Mine indicate the deformation zone consists of broad anastomosing shears with early north-side up, dip-slip displacement and with gold occurring in quartz veins in later faults with somewhat shallower dips. Thus the CBDZ structural setting has a similar style to the SLDZ with older volcanic units thrust southerly over a Porcupine-age sedimentary unit. Explorationists should therefore focus their efforts on this extensive CBDZ and its western extension in Ontario as there are numerous epigenetic gold occurrences documented within the Porcupine assemblage sediments and volcanics in the hangingwall immediately to the north.

Large scale south-verging thrusts can be found as far south as Timmins where the Pipestone deformation zone (PDZ) marks the southern contact between Kidd-Munro assemblage volcanic rocks (2719-2711 Ma) and the Porcupine assemblage. Similar to the northern thrusts, epigenetic gold is commonly found in the hangingwall of the PDZ thrust. Recent geochronology results show that the PDZ extends west of Timmins. Here the new Timmins gold mine in Bristol Township lies at the thrust contact between the Kidd-Munro and Porcupine assemblages where it has been intruded by a late syenitic to ultramafic intrusive complex. Thus the PDZ represents an important and under-explored target for gold exploration within the prolific Timmins gold camp region.

Immediately south of the PDZ, large scale breaks such as the Porcupine-Destor and Larder Lake-Cadillac deformation zones differ from the northern faults discussed above in that they have younger associated sedimentary units of the Timiskaming assemblage (2676-2670 Ma). The Porcupine-Destor deformation zone also truncates the PDZ (Figure 19) and have opposing north-verging displacement vectors. Collectively, the above structural features may indicate that an additional epigenetic gold episode could account for the greater endowment of camps such as Timmins and Kirkland Lake which are proximal to the north-verging thrusts in the southern AGB. However, the presence of a number of recently discovered >1 million ounce gold deposits associated with less explored northern faults should be a major consideration for gold exploration programs in the AGB.