REGIONAL ALTERATION SYSTEMS – CATCHERS POND GROUP & TOPSAILS INTRUSIVE SUITE, NORTH-CENTRAL NEWFOUNDLAND

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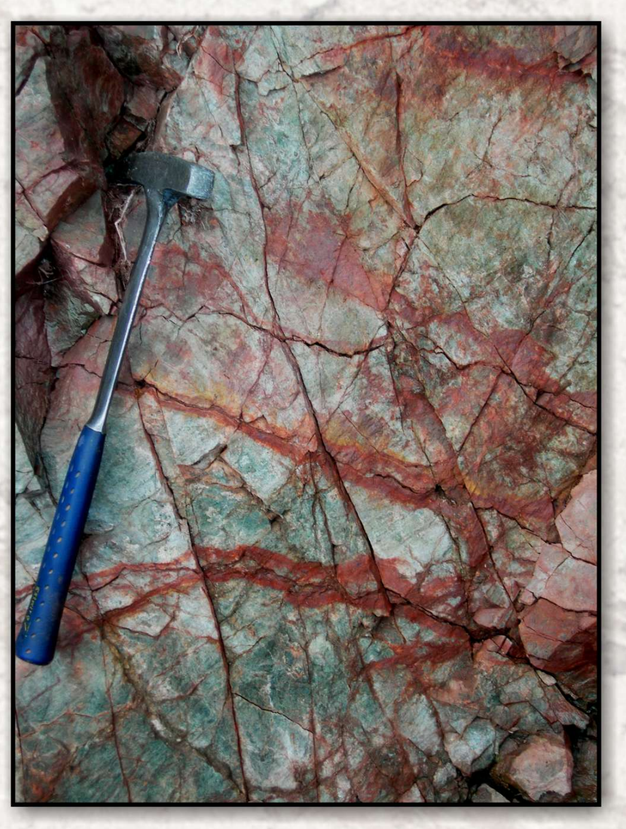
Two important styles and ages of regional alteration are present in the Ordovician Catchers Pond Group and adjacent Silurian rocks between the Green Bay and Lobster Cove faults in western Notre Dame Bay.

(I) Fracture-controlled potassic, propylitic and clay alteration near Siluro-Devonian and Carboniferous fault structures: Faults displacing felsic plutonic rocks of the Silurian Topsails Intrusive Suite and felsic volcanic strata of the Silurian Kings Point Complex also offset earlier-formed thrust sheets in the Ordovician Catchers Pond Group. East of Shoal Pond, these linear fractures crosscut the previously mineralized arc volcanic rocks of the Batters Brook sequence. Carbonate-altered microgranite, sigmoidally-foliated diabase, chalcopyrite-bearing hydrothermal breccia, quartz gabbro and diorite porphyry, quartz syenite and hematized granophyre, cataclastic breccia, sheeted felsic microporphyry and mafic dyke swarms were sequentially emplaced along brittle fault structures. Most of these intrusions were preferentially altered adjacent to their country rocks.

(II) Lithofacies-controlled hydrothermal alteration in the Batters Brook sequence of the Ordovician Catchers Pond Group: Strongly altered felsic pyroclastic strata are relatively abundant within the Batters Brook lithotectonic sequence. More commonly jasperitized than sulphidized, they are interstratified with glassy intermediate flows in a narrow transition zone that developed in a unique paleoenvironmental niche above a substrate of limestone-bearing pillowed basalts. Within preserved volcanic centres, major variations in the volume of flow-banded rhyolite, welded tuff and felsic agglomerate, in the coarseness of waterlain quartz-phyric crystal tuff, and in the thickness of graded lapilli tuff are observed. Such strata pass laterally and vertically into volcaniclastic turbidite deposits. In places, these are scoured by debris flows having detritus from deeply dissected or mineralized parts of the felsic calderas.

Fracture-controlled potassic, propylitic and clay alteration near Siluro-Devonian and Carboniferous fault structures

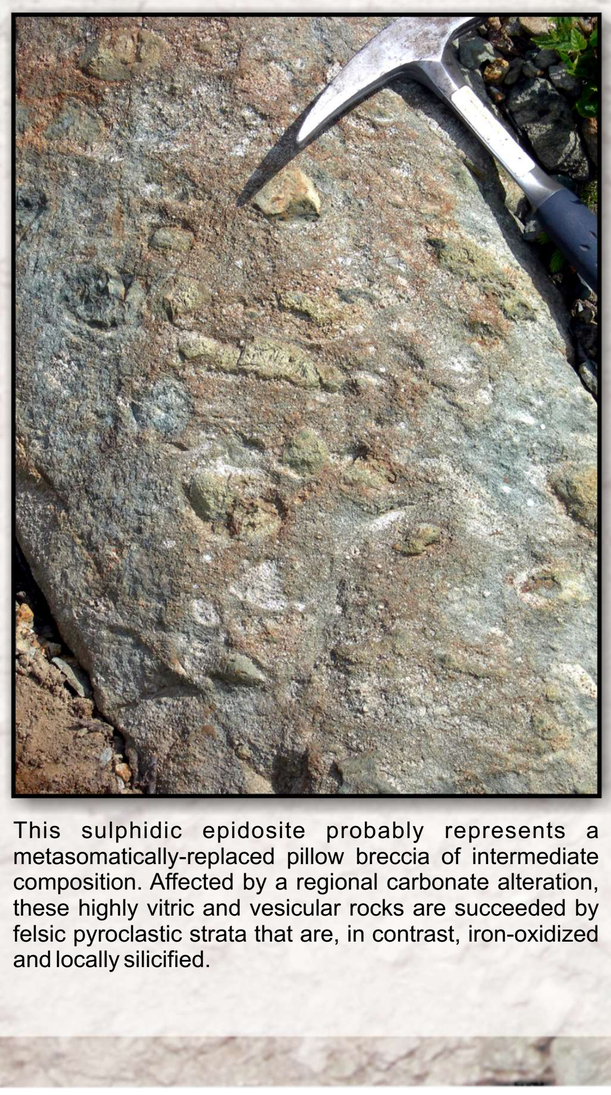
Coeval felsic–mafic plutonic sheets intrude the Silurian Kings Point Complex and Ordovician Catchers Pond Group near the Green Bay Fault. Note secondary K-spar, some having hematitized cores and albitic rims.



Jasper and hematite developed in bilateral alteration zones adjacent to quartz-pyrite-chalcopyrite veinlets. The host rock is a fractured isotropic gabbro containing secondary epidote, chlorite, carbonate and disseminated magnetite.

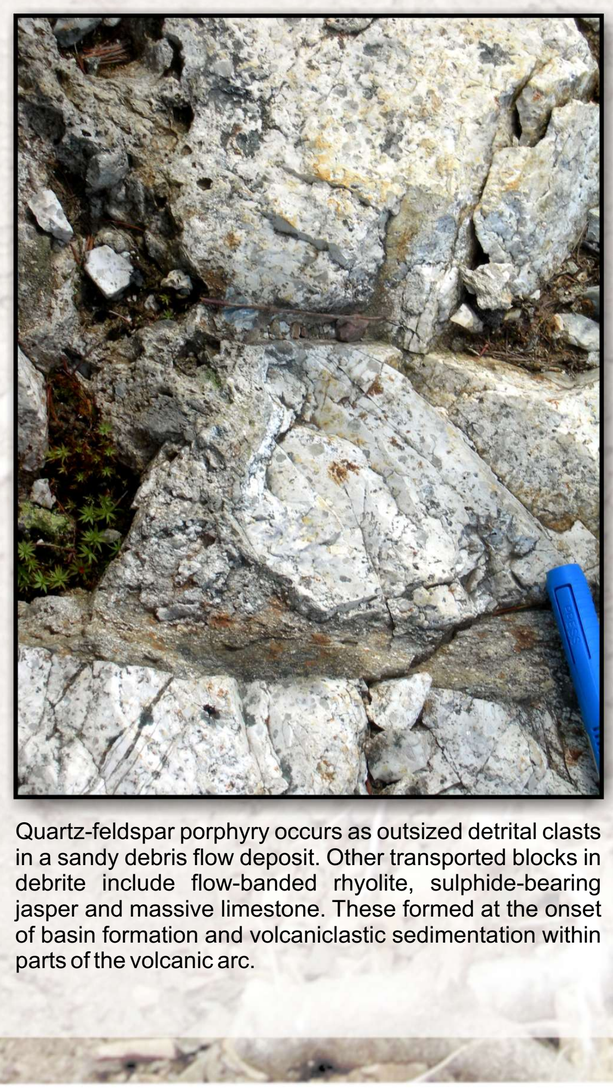
Near the Green Bay Fault, closely-spaced subhorizontal joints pass into cataclastite zones in a sericitized part of a chloritic gabbro. This green-coloured rock, which is partially recomposed, overlies an unconsolidated red clay deposit mainly composed of kaolinite and montmorillonite (J. Hinchey and R. Constantine; personal communication, 2008.)

Lithofacies-controlled hydrothermal alteration in the Batters Brook sequence of the Ordovician Catchers Pond Group



This sulphidic epidosite probably represents a metasomatically-replaced pillow breccia of intermediate composition. Affected by a regional carbonate alteration, these highly vitric and vesicular rocks are succeeded by felsic pyroclastic strata that are, in contrast, iron-oxidized and locally silicified.

Stratabound zones of lithophysae developed within permeable welded tuffs in certain felsic volcanic centres. These geoids display concentric bands of jasper and hematite that surround a core of orange agate. Such devitrified strata pass into belts of pyritic sericite schist, where the felsic volcanic rocks were more altered and deformed.



Quartz-feldspar porphyry occurs as outsized detrital clasts in a sandy debris flow deposit. Other transported blocks in debrite include flow-banded rhyolite, sulphide-bearing jasper and massive limestone. These formed at the onset of basin formation and volcaniclastic sedimentation within parts of the volcanic arc.