

GEOLOGY OF THE EASTERN ST. ALBAN'S MAP AREA (NTS 01M/13), DUNNAGE AND GANDER ZONES, INTEGRATED WITH THE RESULTS FROM AN AIRBORNE GEOPHYSICAL SURVEY

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The St. Alban's map sheet 01M/13 on the south coast of Newfoundland includes part of the boundary between Gander and Dunnage zones, two of the region's major tectono-stratigraphic zones. The eastern part of the map sheet was mapped at a 1:50 000 scale following a new detailed airborne geophysical survey covering most of the area (Kilfoil, 2016). The new geophysical magnetic and radiometric data are used to refine and update the geology of the St. Alban's map area, building on previous mapping by Colman-Sadd (1976a). The volcano-sedimentary sequences of the Ordovician Baie d'Espoir Group make up most of the map area and are assigned to the Exploits Subzone of the Dunnage Zone. In the St. Alban's map area, the Baie d'Espoir Group has been divided into the Salmon River Dam Formation, the St. Josephs Cove Formation, the Riches Island Formation, and the Isle Galet Formation (e.g., Colman-Sadd, 1976b). The Day Cove fault separates the Baie d'Espoir Group from the Little Passage gneiss, assigned to the Gander Zone, which is intruded by the megacrystic Gaultois granite. Both Little Passage gneiss and Gaultois granite are intruded by a muscovite-biotite granite assigned to the Northwest Brook complex.

Several sulphide mineralized quartz veins occur within the Baie d'Espoir Group. The Isle Galet Formation has been a major focus of exploration in the area for its Sb, As and Au potential, but also quartz veins within the St. Josephs Cove Formation can contain galena, chalcopyrite, and stibnite, besides ubiquitous pyrite.



Overlooking Bay d'Espoir from Frenchman Head

Dunnage Zone



Typical interbedding of shale (medium to dark grey) and siltstone (light brown) of St. Josephs Cove Formation at Lee Cove. Shales often developed two cleavages, whereas siltstones are more competent. The formation is folded on small and large scale, often into recumbent folds. Crosscutting quartz veins may contain sulphide mineralization of arsenopyrite, stibnite or galena.

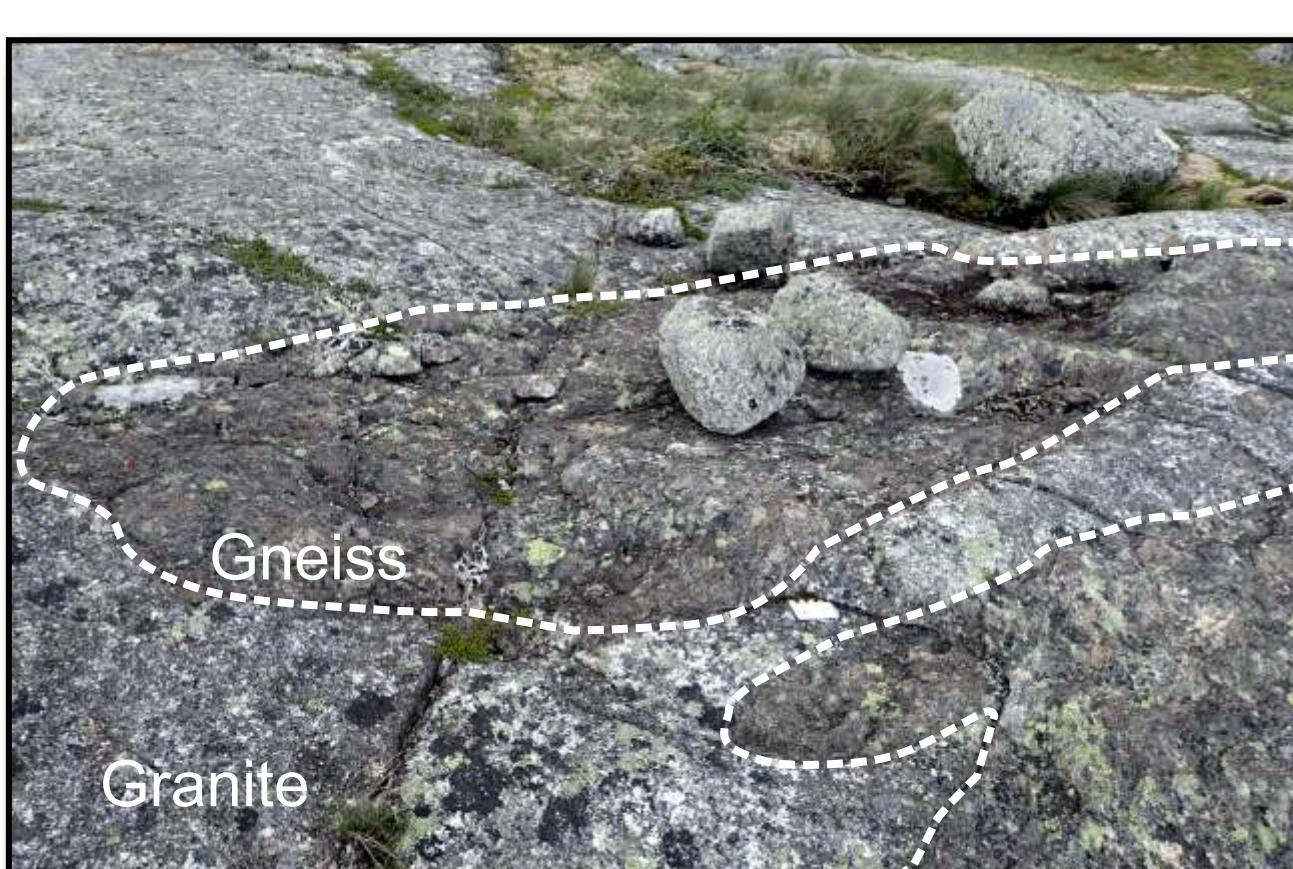
Gander Zone



Little Passage gneiss showing compositional layering of quartz-rich and biotite-rich layers that are often folded. Rocks commonly show a rusty alteration, which is, combined with compositional layering, a distinctive feature of these rocks.



Tectonic contact between sandstone of St. Josephs Cove Formation and phyllite of Riches Island Formation, close to Big Rattling Brook. Rocks of the Riches Island Formation are deformed more than those of the St. Josephs Cove Formation and often develop schistosity. Semipelitic schists of the Riches Island Formation can contain porphyroblastic garnet. Deformed brachiopod shells and a trilobite helped constrain this formation to Lower Ordovician (Late Arenig (Floian), Boyce et al., 1993).



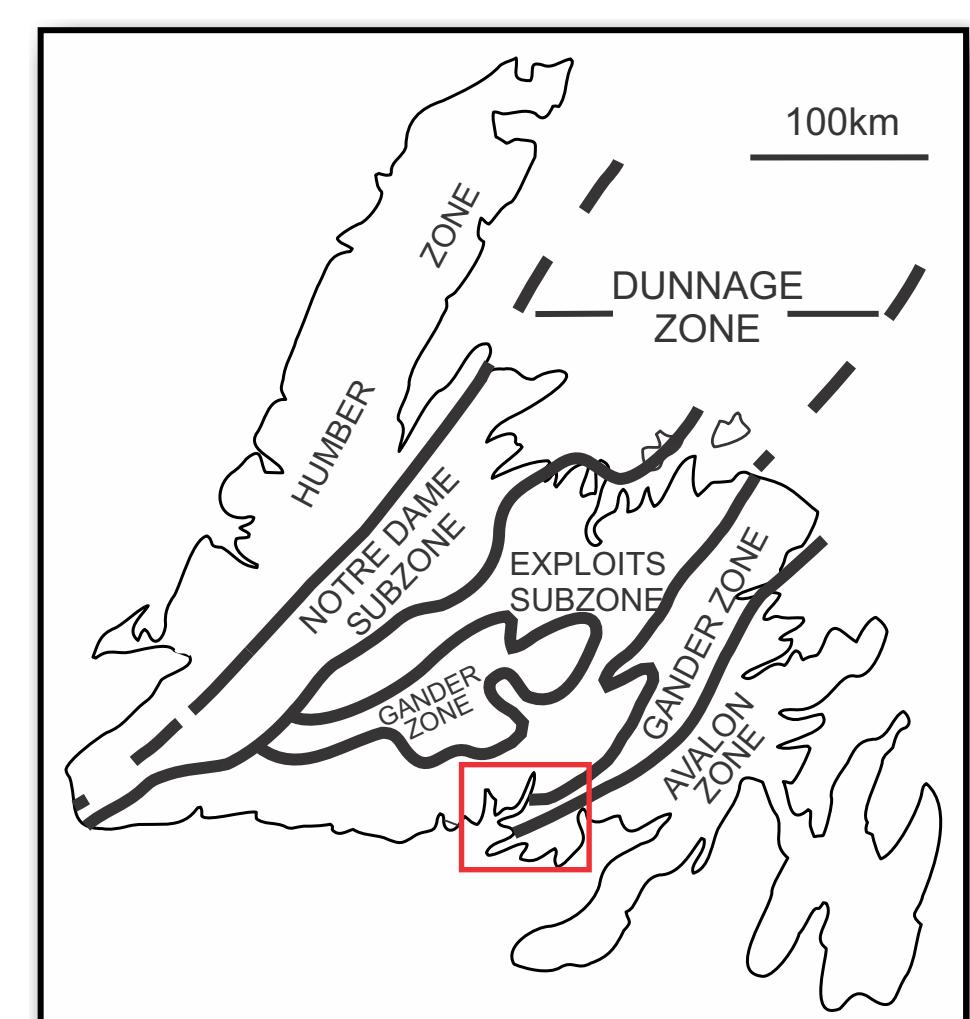
Fragments of strongly folded Little Passage gneiss within megacrystic Gaultois granite. Many outcrops in the Gander Zone show a complex intrusive interplay of gneiss and granite. The Gaultois granite has a regional foliation defined by elongated biotite grains and flattening of quartz grains. Rocks of this intrusive suite range from granitic over granodioritic to dioritic composition and are often foliated.



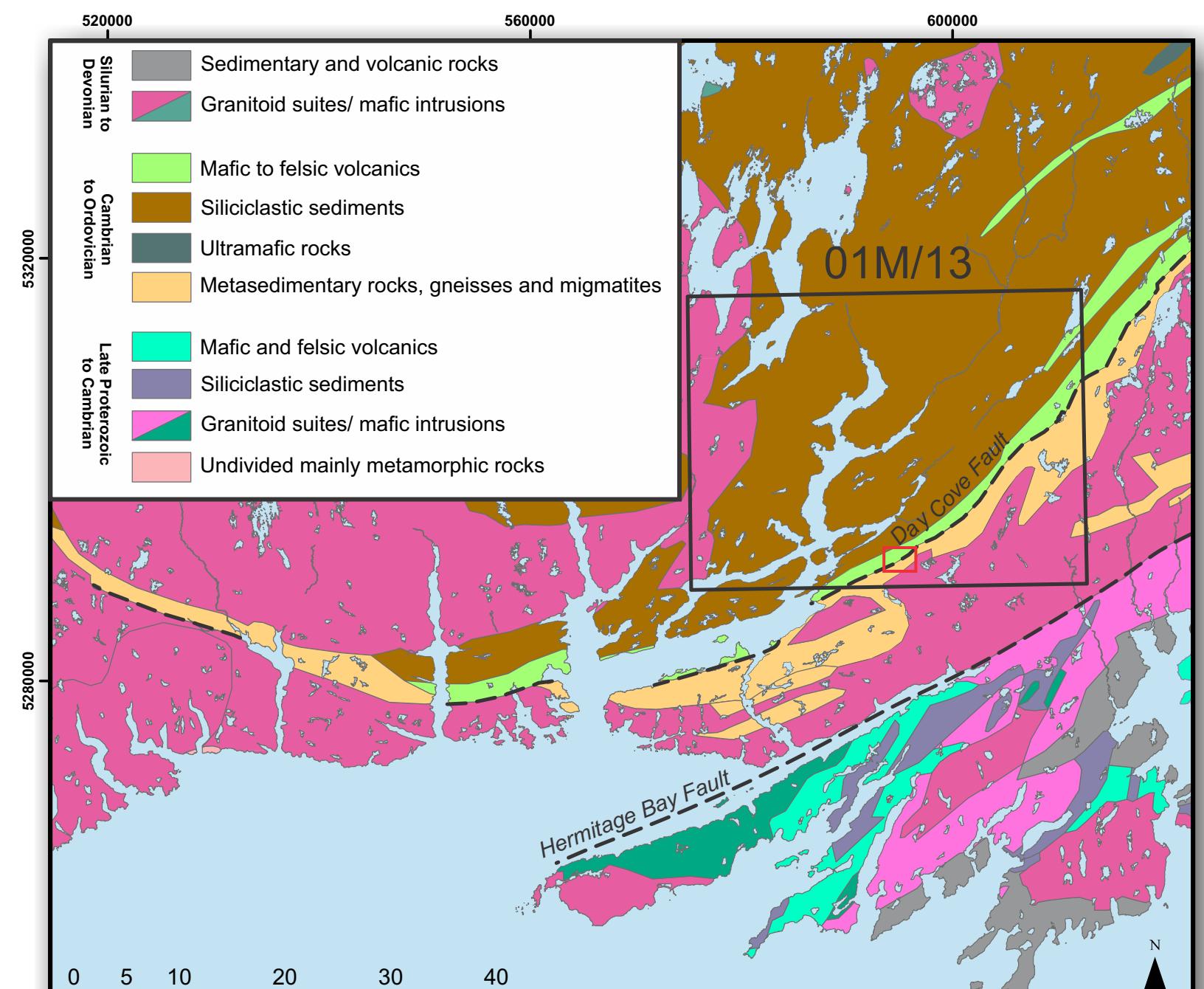
Mylonized phyllite of the Isle Galet Formation, close to the Day Cove fault. Primary sedimentary bedding is obscured by intense deformation. Main rock types are phyllites, pelitic to semipelitic schists, graphitic schists and slates, and felsic to mafic metavolcanic rocks.



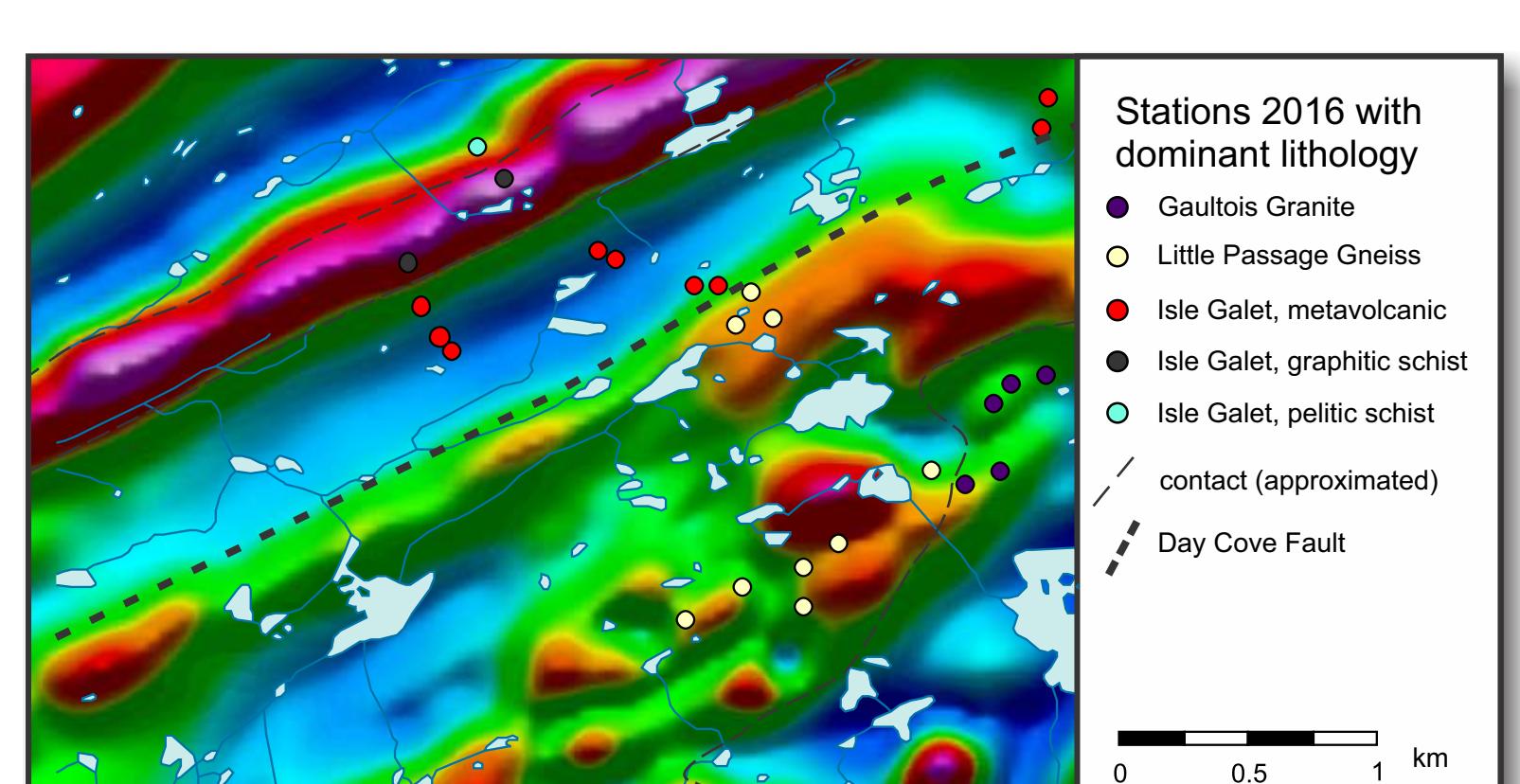
Megacrystic Gaultois granodiorite is intruded by a granite of the Northwest Brook Complex (light pink). This late tectonic two-mica granite has a weak foliation and sometimes contains tourmaline and garnet. Several pegmatite and aplite dykes intrude the southeastern area of the map area.



The island of Newfoundland showing the major tectono-stratigraphic provinces; red outline shows regional geology displayed below.



Regional geology of southeastern Newfoundland modified after Colman-Sadd et al. (1990) and GSNL Geoscience Atlas and location of map sheet 01M/13. Small red box shows location of geophysical detail below.



Detail of residual magnetic intensity (Kilfoil, 2016) showing outcrop locations and respective dominant rock types. The airborne geophysical data is used to connect lithology between stations over boggy areas and ponds. For instance, the graphitic schist of the Isle Galet Formation shows a higher and the metavolcanic units a lower residual magnetic intensity. The location of the Day Cove fault is also traceable: instead of layered volcano-sedimentary sequences of the Baie d'Espoir Group, the Little Passage gneiss and Gaultois granite show their complex relationship in the geophysical data.

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