DESCRIPTIVE NOTES

The Rose Blanche map-area has a physiography very similar to the adjacent Port aux Basques map-area (van Staal et al., 1995), and is underlain by the same rock units. These rock units have been assigned to the Dashwoods and Exploits subzones, and Gander Zone (see also Williams et al., 1988). Access to the area is by route 470 from Channel Port aux Basques to Harbour Le Cou and a poorly maintained gravel road to the Cape Ray gold deposit. The rugged northern and eastern parts of the map-area are only accessible by foot or helicopter.

The Rose Blanche area was previously mapped by Gillis (1972) as part of a 1:250,000 study, and more recently, Brown (1976) mapped the area at 1:50,000 scale.

Rocks of the Dashwoods Subzone occur north of the Cape Ray Fault in the northwestern corner of the area. Here obducted Upper Cambrian to Lower Ordovician remnants of the ophiolitic Long Range mafic-Ultramafic Complex (LRMUC; unit **OL**) and Lower to Middle Ordovician magmatic arc rocks of the Cape Ray Complex (CRC; unit **OC**) are both unconformably overlain by Upper Ordovician to Devonian igneous and sedimentary rocks of the Windsor Point Complex (unit **ODW**). The Exploits Subzone is represented by amphibolite facies rocks of the Grand Bay Complex (unit **OG**) and Harbour Le Cou Group (unit **OH**; van Staal et al., 1995) , and greenschist facies rocks of the Bay du Nord Group (unit **OB**; Lin et al., 1993). The Gander Zone is represented by the amphibolite facies psammites and pelites of the Port aux Basques Complex (unit **OP**).

DASHWOODS SUBZONE

The LRMUC in the Rose Blanche area is represented by layered to massive metagabbro (unit **OLg**), which was intruded by Lower to Middle Ordovician granodiorite and tonalite (unit **OCt**) of the Cape Ray Complex and Upper Ordovician to Silurian granite (**OSg**). The tonalites and granodiorites of the Cape Ray Complex yielded U-Pb zircon ages ranging between 488 and 469 Ma (Dubé et al., 1996). They are generally deformed into orthogneisses, exhibiting a well developed composite S_1/S_2 foliation and a moderate to strong extension lineation. The younger granites generally show little or no evidence of penetrative deformation.

The CRC and LRMUC are unconformably overlain by moderately to highly strained LS tectonites developed from Upper Ordovician to Devonian conglomerates and volcanic rocks (unit **ODWv**) and sedimentary rocks (unit **ODWs**) of the Windsor Point Complex. Ductile deformation is localized along the Cape Ray Thrust and closely associated strike slip faults. Timing of this deformation is bracketed between 415 and 384 Ma (Dubé et al., 1996). Volcanic rocks of the Windsor Point Complex are closely associated with high level, consanguineous mafic and felsic plutons. A quartz gabbro gave an Upper Silurian U-Pb zircon age of 424 ± 4 Ma; the crosscutting Windowglass Hill Granite (unit **ODWg**) yielded an identical age of 424 ± 2 Ma (Dubé et al., 1996). The bulk of the volcanic rocks in the Windsor Point Complex are therefore thought to be Silurian in age. However,a rhyolite with a U-Pb zircon age of 453 ± 5 Ma unconformably overlies CRC tonalitic gneiss in the adjacent Port aux Basques map-area, demonstrating that at least some Windsor Point Complex volcanic rocks are Upper Ordovician.

EXPLOITS SUBZONE

Grand Bay Complex

The Grand Bay Complex occupies the western part of the Exploits Subzone. It consists mainly of semi-pelitic and pelitic schists (unit **OGs**), containing garnet-, kyanite-, staurolite- and in places gedrite. Gedrite is particularly common east of the Isle aux Morts River. Thin coticule beds, amphibolites (unit **OGm**), Kelby Cove orthogneisses (unit **OK**) and highly strained sheets of Port aux Basques Granite (unit **Ogp**) are intricately interlayered with these schists. During the Upper Ordovician to Late Silurian all were transformedinto high strain LS tectonites as a result of three generations of folding and associated deformation (van Staal et al., 1994). Deformation was accompanied by relatively high pressure amphibolite-facies metamorphism that culminated during F_2 (Burgess et al., 1995). The rocks of the Grand Bay complex are interpreted to be of Lower to Middle Ordovician age, based on intrusive relationships by the Upper Ordovician Port aux Basques Granite (ca. 453 Ma) and older (ca. 470 Ma) igneous rocks of the Kelby Cove suite (van Staal et al., 1995).

The LS tectonites are intensely folded on all scales. Giant, non-cylindrical to locally sheath-like F_3 folds, in places superimposed on large F_2 structures created a complex geometry, readily visible on the air photographs. As a result of the complex structure and presence of extensive orthogneisses near the contact between the Grand Bay and Port aux Basques complexes, the nature and exact location of this boundary is not well known. The presence of Kelby Cove orthogneisses and amphibolite dykes and sills in both complexes suggests this contact may be a highly tectonized basement-cover contact; with the Port aux Basques Complex representing basement to the sediments of the Grand Bay Complex. All regional ductile structures are cut by the undeformed Isle aux Morts Brook Granite (unit **Dgl**), which yielded a U-Pb zircon age of 386 ± 3 Ma (Dubé et al., 1996).

Near the western margin of the map-area, a distinctive muscovite-kyanite schist with a well developed differentiated (metamorphic) layering, possibly representing an altered and highly tectonized felsic tuffite, is host to a thin and long Zn-Pb-Cu-Ag disseminated to massive sulphide body (Isle aux Morts prospect, O Neill, 1985; O Neill and Strong, 1988). Where exposed, the mineralization occurs in a late tectonic breccia, containing broken up granite clasts, discretely bounded by Kelby Cove orthogneisi in the structural footwall. Pyrite mineralization continues along strike and is commonly associated with gedrite blastesis in the surrounding mafic and felsic rocks.

Harbour Le Cou Group

The Harbour Le Cou Group and Bay du Nord Group define the eastern part of the Exploits Subzone. The Harbour Le Cou Group underlies most of the Rose Blanche map-area It was originally defined as a small unit by Brown (1976) restricted to the villages of Rose Blanche and Harbour Le Cou. Subsequent investigations showed that most of the reworked Port aux Basques gneiss of Brown (1976) represents metasedimentary rocks (van Staal et al., 1992) that are best included in an expanded Harbour Le Cou Group (Lin et al., 1993). The Harbour Le Cou Group has been subdivided into the Otter Bay and the Grandy's formations. The Otter Bay Formation (unit **OHo**) consists of thick-to thin-bedded, locally garnet-bearing feldspathic psammite with thin beds of rusty, pyritiferous pelite. The thick-bedded, locally graded psammites commonly contain grossular, hornblende, clinozoisite and clinopyroxene-bearing calc-silicate lenses and pods, probably representing metamorphosed calcareous concretions. Narrow bodies of tholeiitic amphibolite (unit **OHom**) are relatively common and mainly represent narrow, metamorphosed and transposed tholeiitic diabase and gabbroic intrusions These mafic intrusions probably fed lenses of tholeiitic pillows basalts occurring near the contact with the structurally overlying Grandy's Formation (van Staal et al., 1992; Lin et al., 1993; Schofield et al., 1993). The Grandy's Formation (unit **OHg**) consists mainly of rusty pelitic and semi-pelitic schists and gneisses, interlayered with coticule beds. Very sparse, thin fuchsite-bearing layers have been observed in the village of Rose Blanche. The contact with the underlying psammites and pelites of the Otter Bay Formation is gradational. The pelitic schists of the Grandy's Formation are lithologically similar to the paraschists in the Grand Bay Complex. They probably represent metamorphic equivalents of the Lower to Middle Ordovician pyritiferous dark shales and siltsones interbedded with coticules in the northeastern part of the Exploits Subzone (Williams, 1992). Amphibolites are extremely rare or absent in the Grandy's Formation. They are restricted to the contact zone with the Otter Bay Formation. This relationship suggest that the Grandy's Formation is younger than the Otter Bay Formation. The Otter Bay Formation is thought to be Lower to Middle Ordovician in age on basis of geochemical similarities between the amphibolites and tholeiitic intrusions in the Margaree orthogneiss, which has a U-Pb zircon age of ca 470 Ma (van Staal et al., 1994); hence the Grandy's Formation is probably Middle Ordovician.

High grade amphibolite-facies metamorphism, characterised by sillimanite in the meta-pelites is ubiquitous in the Harbour Le Cou Group. Hornblende in the amphibolites is generally brownish-green to brown and is commonly accompanied by diopside and/or garnet (Burgess et al., 1995). Migmatisation of the pelites steadily increases eastwards and culminates in rocks containing more than 70% leucosome near the contact with the Rose Blanche Granite pluton (unit **Sgr**), which yielded a preliminary U-Pb zircon age of ca 419 Ma (van Staal et al., 1994). Intrusion of the Rose Blanche Granite coincides with peak metamorphism as deduced from monazite studies in the migmatites. The Rose Blanche Granite is a distinctive white, generally two mica, locally garnet-bearing granite. The granite intruded during the later stages of F_2 because it contains a moderately-developed S_2 foliation, which it also cuts locally. It occurs as several narrow sheets that have been folded into complex geometries by F_2 and F_3. It only intruded the Harbour Le Cou Group in this map-area, suggesting that final juxtaposi- [illegible]

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GEOLOGY

ROSE BLANCHE

NEWFOUNDLAND

Scale 1:50 000 – Échelle 1/50 000

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