

Silurian Notre Dame Bay nappe in the Newfoundland Appalachians

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The 65 km wide Notre Dame Bay (NDB) nappe forms the structurally highest element of the Dunnage Zone (DZ) of the Newfoundland Appalachians. The NDB nappe consists of ophiolitic and volcano-sedimentary units of Cambrian to Ordovician age, which display lithological and geochemical features typical of rocks found in modern, supra-subduction zone settings. The major, NE-SW trending Green Bay Fault (GBF) forms the western limit to the Notre Dame nappe, whereas the southern and eastern boundary of the nappe are formed by the Lobster Cove-Chanceport Fault (LCCF). The northern boundary lies off-shore and is not exposed, but can be delineated on the basis of its geophysical signature. The correlation of the western and southern boundaries of the NDB nappe with the gravity high suggests that the elliptical gravity pattern bounded by the 30 mGal contour corresponds with the offshore extent of NDB nappe.

Structural and stratigraphic relations observed along the LCCF suggest that it represents the sole thrust of the NDB nappe. Detailed kinematic studies along this fault (Szybinski, 1988; Calon and Szybinski, 1988) indicate eastward emplacement of the NDB followed by post-emplacement "collapse" of the nappe towards the west and late stage steepening of its southern boundary. The Baie Verte Line, currently lying about 20 to 30 km west of the GBF and corresponding with the western margin of the Dunnage Zone, provides a maximum western site for the root zone. The apparent younging of rocks of the nappe towards the LCCF implies that the

NDB nappe may form a regional-scale recumbent fold.

The NDB nappe is underlain by the Silurian Springdale Group (SG) and by the Buchans-Roberts Arm Volcanic Belt (BRAVB). Both, the SG and the BRAVB are deformed into fold and thrust belts, but the BRAVB displays a pronounced pre-Silurian deformation history. Both are also overlain by red beds, which are the youngest stratigraphic unit overridden by the NDB nappe. It is suggested that red beds are in fact dynamically related to the NDB nappe, and were deposited in the foreland basin forming in front of the advancing nappe. Age constraints imply a post-425 Ma age for the red beds and pre-408 Ma for nappe emplacement.

The presence of the NDB nappe has significant implications for the definition and distribution of the Notre Dame Subzone. The nappe emplacement records a distinctive geologic event in evolution of the Dunnage Zone and requires reappraisal of current tectonostratigraphic divisions, which should not only reflect lateral, but also vertical zonation to address the presence of a nappe pile with subhorizontal rather than vertical boundaries. We propose to define the Notre Dame Bay nappe as an additional Dunnage subzone and to abandon the name "Notre Dame Subzone". Alternatively, different nappes, such as the NDB nappe and BRAVB can be treated as nappe complexes within the Dunnage allochthon, similarly to the nomenclature used presently in the Scandinavian Caledonides.