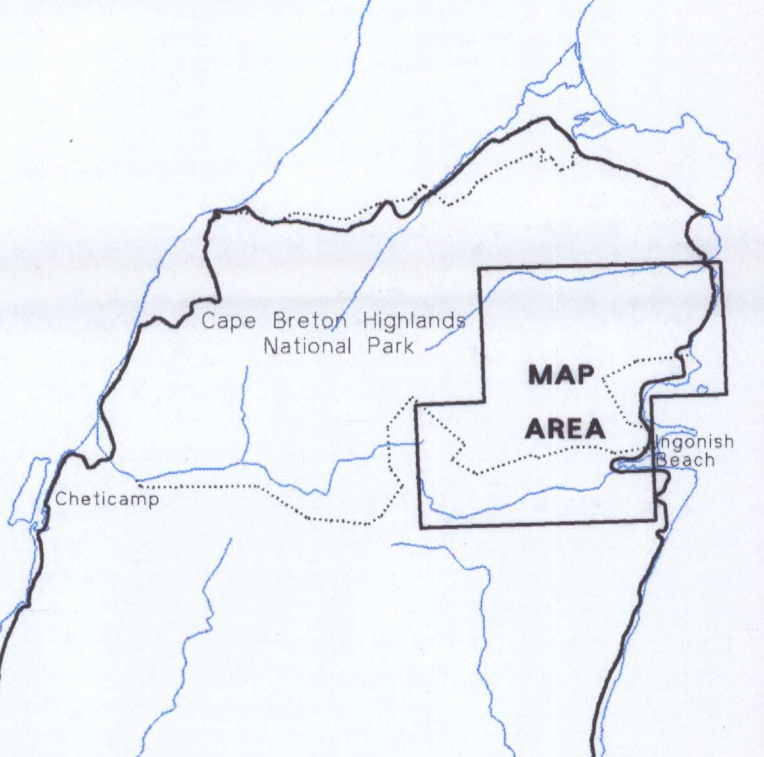


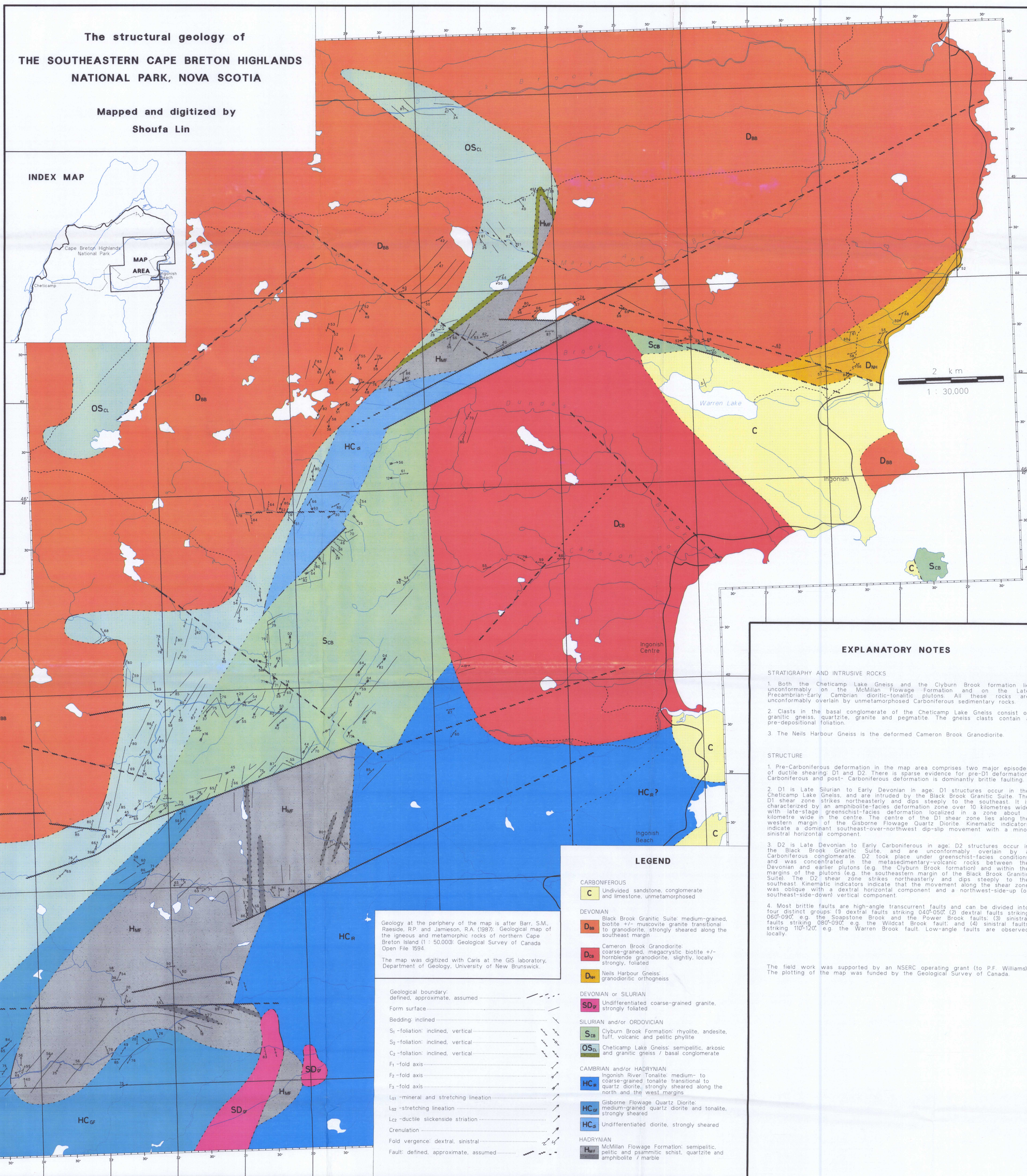
The structural geology of
THE SOUTHEASTERN CAPE BRETON HIGHLANDS
NATIONAL PARK, NOVA SCOTIA

Mapped and digitized by
Shoufa Lin

INDEX MAP



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EXPLANATORY NOTES

STRATIGRAPHY AND INTRUSIVE ROCKS

- Both the Cheticamp Lake Gneiss and the Clyburn Brook formation lie unconformably on the McMillan Flowage Formation and on the Late Precambrian-Early Cambrian dioritic-tonalitic plutons. All these rocks are unconformably overlain by unmetamorphosed Carboniferous sedimentary rocks.
- Clasts in the basal conglomerate of the Cheticamp Lake Gneiss consist of granitic gneiss, quartzite, granite and pegmatite. The gneiss clasts contain a pre-depositional foliation.
- The Neils Harbour Gneiss is the deformed Cameron Brook Granodiorite.

STRUCTURE

- Pre-Carboniferous deformation in the map area comprises two major episodes of ductile shearing, D1 and D2. There is sparse evidence for pre-D1 deformation. Carboniferous and post-Carboniferous deformation is dominantly brittle faulting.
- D1 is Late Silurian to Early Devonian in age. D1 structures occur in the Cheticamp Lake Gneiss and are intruded by the Black Brook Granitic Suite. The D1 shear zone strikes northeasterly and dips steeply to the southeast. It is characterized by an amphibolite-facies deformation zone over 10 kilometres wide with late-stage greenschist-facies deformation, localized in a zone about 1 kilometre wide in the centre. The centre of the D1 shear zone lies along the western margin of the Gisborne Flowage Quartz Diorite. Kinematic indicators indicate a dominant southeast-over-northwest dip-slip movement with a minor sinistral horizontal component.
- D2 is Late Devonian to Early Carboniferous in age. D2 structures occur in the Black Brook Granitic Suite, and are unconformably overlain by a Carboniferous conglomerate. D2 took place under greenschist-facies conditions and was concentrated in the metasedimentary-volcanic rocks between the Devonian and earlier plutons (e.g. the Clyburn Brook formation) and within the margins of the plutons (e.g. the southeastern margin of the Black Brook Granitic Suite). The D2 shear zone strikes northeasterly and dips steeply to the southeast. Kinematic indicators indicate that the movement along the shear zone was oblique with a dextral horizontal component and a northwest-side-up (or southeast-side-down) vertical component.
- Most brittle faults are high-angle transcurent faults and can be divided into four distinct groups: (1) dextral faults striking 040°-050°; (2) dextral faults striking 060°-090°; e.g. the Soapstone Brook and the Power Brook faults; (3) sinistral faults striking 080°-090°; e.g. the Wildcat Brook fault; and (4) sinistral faults striking 102°-120°; e.g. the Warren Brook fault. Low-angle faults are observed locally.

The field work was supported by an NSERC operating grant (to P.F. Williams). The plotting of the map was funded by the Geological Survey of Canada.

LEGEND

CARBONIFEROUS

C Undivided sandstone, conglomerate and limestone, unmetamorphosed

DEVONIAN

D_{BB} Black Brook Granitic Suite: medium-grained, biotite +/- muscovite granite transitional to granodiorite; strongly sheared along the southeast margin

D_{CB} Cameron Brook Granodiorite: coarse-grained, megacrystic biotite +/- hornblende granodiorite, slightly, locally strongly, foliated

D_{NH} Neils Harbour Gneiss: granodioritic orthogneiss

DEVONIAN or SILURIAN

SD_g Undifferentiated coarse-grained granite, strongly foliated

SILURIAN and/or ORDOVICIAN

SC_a Clyburn Brook Formation: rhyolite, andesite, tuff, volcanic and pelitic phyllite

OS_{cl} Cheticamp Lake Gneiss: semipelite, arkosic and granitic gneiss / basal conglomerate

CAMBRIAN and/or HADRYNIAN

HC_a Ingonish River Tonalite: medium- to coarse-grained tonalite transitional to quartz diorite, strongly sheared along the north and the west margins

HC_b Gisborne Flowage Quartz Diorite: medium-grained quartz diorite and tonalite, strongly sheared

HC_c Undifferentiated diorite, strongly sheared

HADRYNIAN

H_{MF} McMillan Flowage Formation: semipelite, pelitic and psammitic schist, quartzite and amphibolite / marble

Geology at the periphery of the map is after Barr, S.M., Raeside, R.P. and Jameson, R.A. (1987). Geological map of the igneous and metamorphic rocks of northern Cape Breton Island (1:50,000). Geological Survey of Canada Open File 1594.

The map was digitized with Caris at the GIS laboratory, Department of Geology, University of New Brunswick.

- Geological boundary:
defined, approximate, assumed
- Form surface
- Bedding: inclined
- S₁-foliation: inclined, vertical
- S₂-foliation: inclined, vertical
- C₂-foliation: inclined, vertical
- F₁-fold axis
- F₂-fold axis
- F₃-fold axis
- L₁-mineral and stretching lineation
- L₂-stretching lineation
- L₂-ductile slickenside striation
- Crenulation
- Fold vergence: dextral, sinistral
- Fault: defined, approximate, assumed