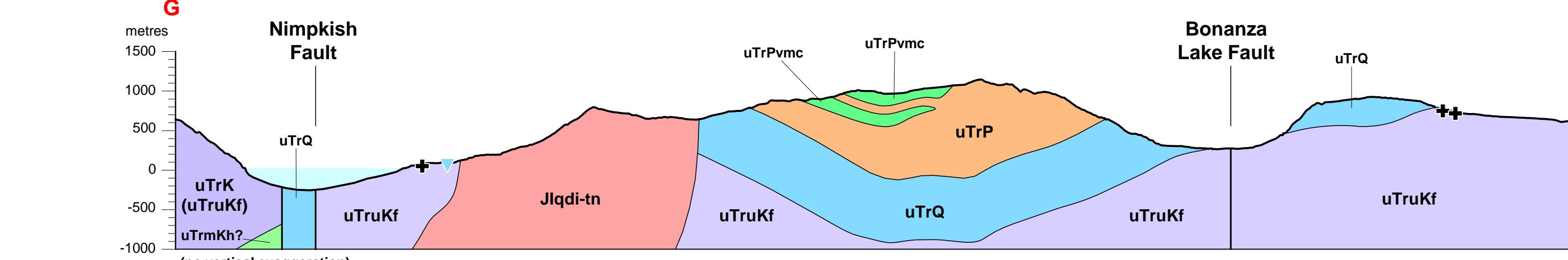
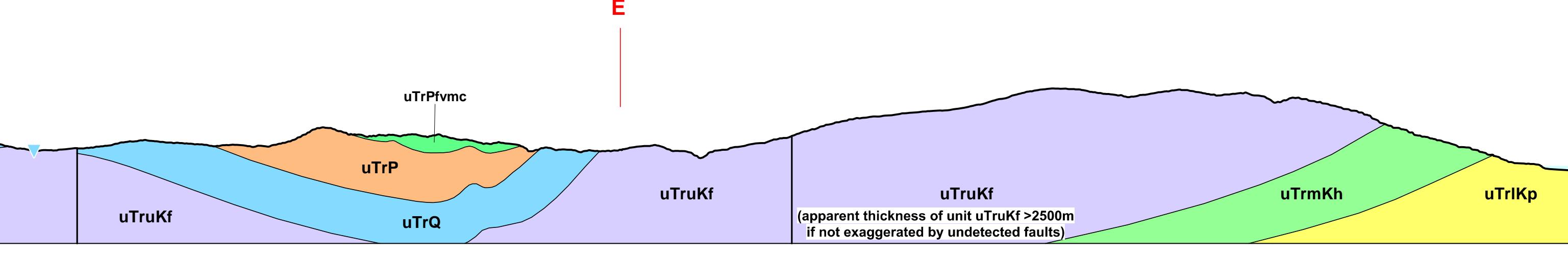
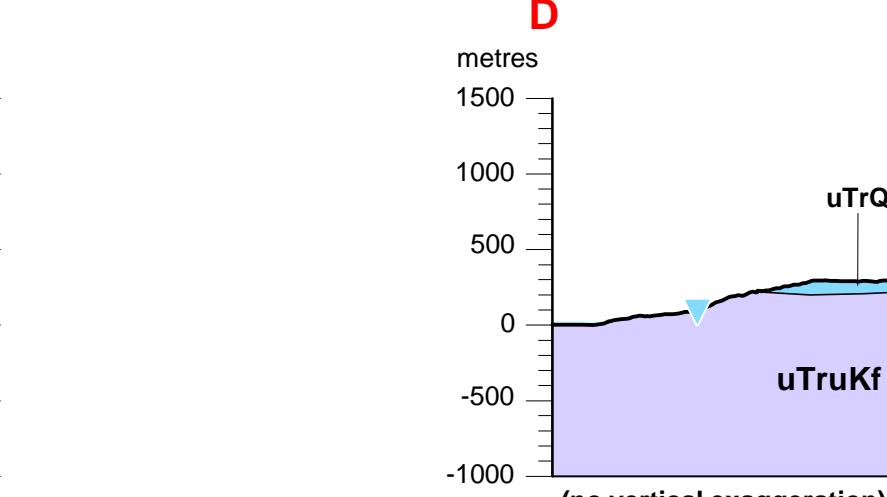
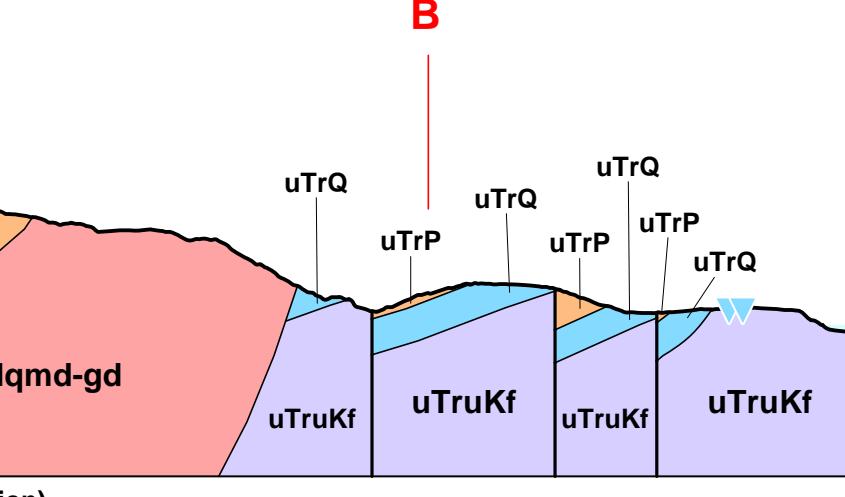
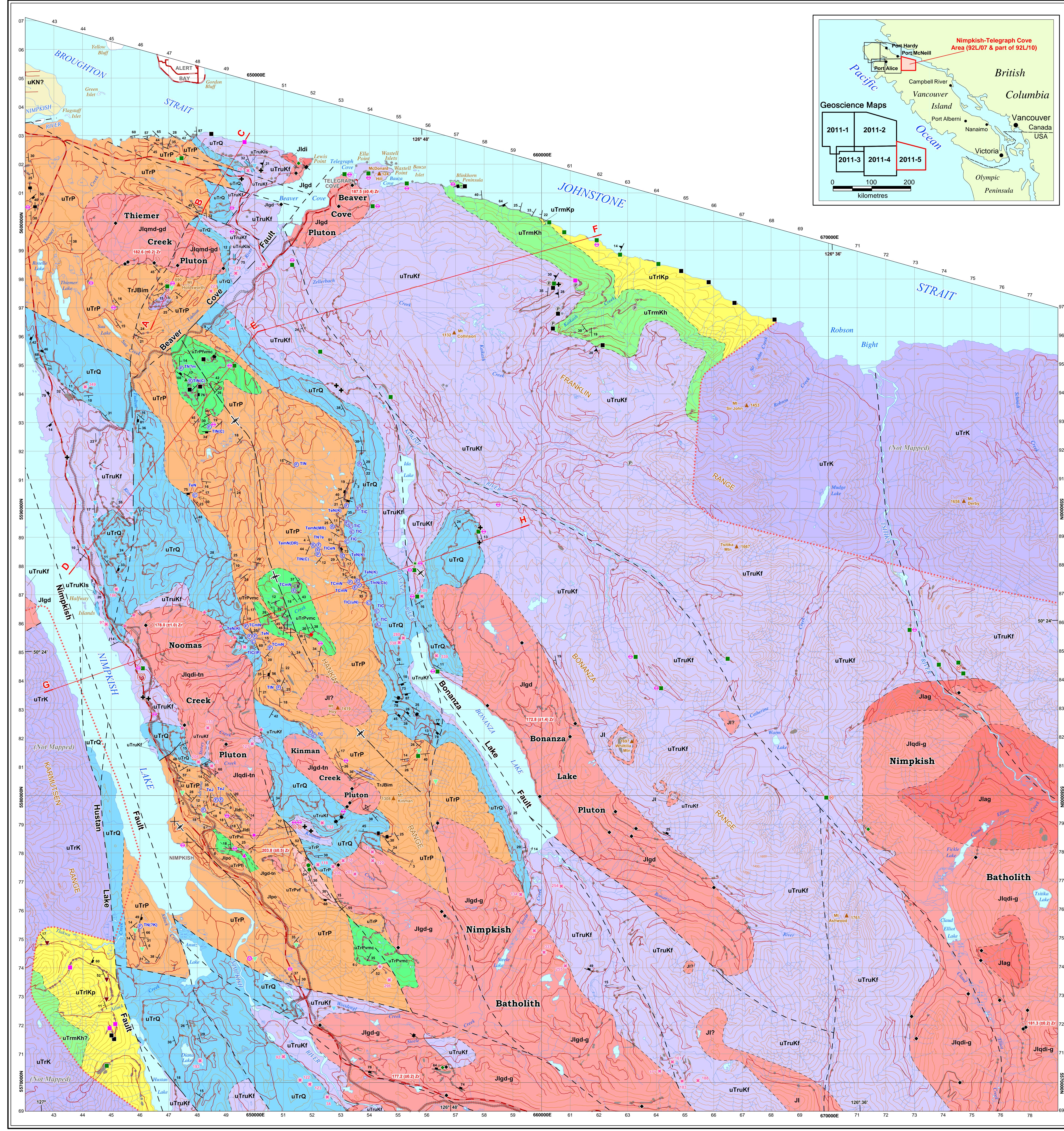
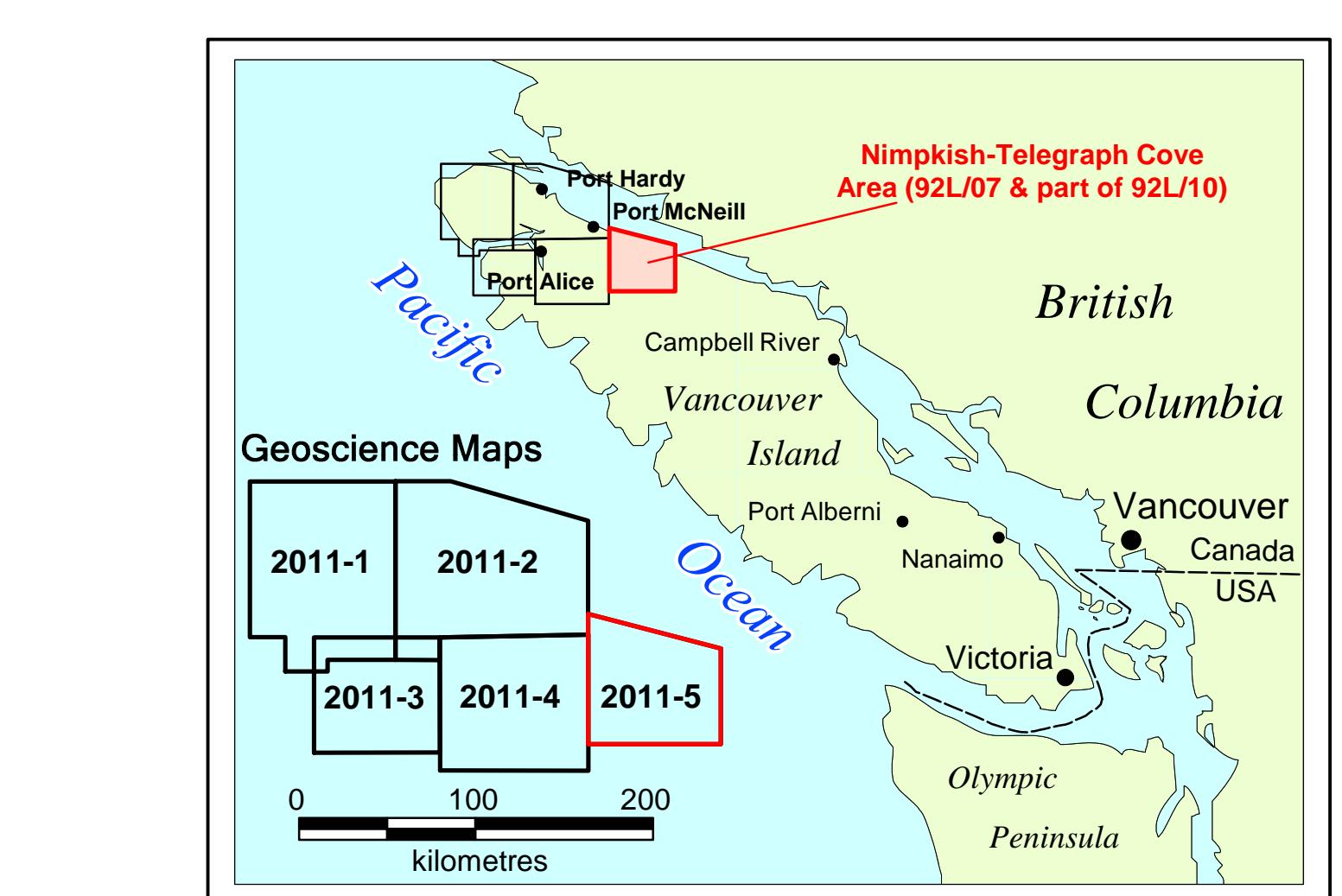


# Geology, Geochronology, Lithogeochemistry and Metamorphism of the Nimpkish-Telegraph Cove Area, Northern Vancouver Island

NTS 092L/07 &amp; part of 92L/10

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K.A. Johnston, R.M. Friedman, J.K. Mortensen, M.J. Orchard and C.A. McRobertsPALEONTOLOGY by  
M.J. ORCHARD (Geological Survey of Canada)  
C.A. MCROBERTS (SUNY, Cortland)GEOLOGY by  
G.T. NIXON, M.C. KELMAN, J.P. LAROCQUE,  
D.B. STEVENSON, L.A. STOKES, A. PALS, J. STYAN  
and K.A. JOHNSTON (BC Geological Survey)GEOCHRONOLOGY by  
R.M. FRIEDMAN and J.K. MORTENSEN  
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## LAYERED ROCKS

## UPPER CRETACEOUS NANAIMO GROUP EQUIVALENTS (IN PART)

## CAMPANIAN TO ?MAASTRICHTIAN

**uTrKf**: Gray to greenish grey and brown, medium to coarse-grained arkosic to lithic wacke, pebble to cobble conglomerate, locally cemented laminae, some small intercalations;

**uTrKh**: Small outcrop of dark grey-green, plagioclase-micaschist (1-2 cm) basalt flow; commonly amygdaloidal and locally exhibiting trachytoid texture, intercalated with aplinitic or plagioclase-phric near the top of the flow;

**uTrKp**: Thin (0.5-5 m) beds and lenses of pale to medium grey, massive to rarely bioclastic or ooidic limestone intercalated with basalt near the top of the flow succession;

**Middle Karmutsen Formation: Hyaloclastite Member**: Dark grey-green, massive to medium bedded, basalts hyaloclastite breccia, including pillow-fragment breccia, and medium bedded to laminated hyaloclastite sandstone, may locally pass laterally into pillowed basalt flows;

**uTrPmc**: Dark grey-green basaltic breccias and lapilli tuff; aplinitic to coarsely clinopyroxene-olivine-plagioclase-phric

**uTrPvc**: Dark grey-green basaltic flows and minor volcanioclastic breccia and lapilli tuff; interbedded mudstone, siltstone, shale and shale, locally fossiliferous

**uTrPvi**: Dark grey-green, andesitic volcanioclastic breccia and lapilli tuff; aplinitic to sparsely plagioclase-phric

**uTrPh**: Dark grey-green andesitic flows; aplinitic to sparsely plagioclase-phric

**uTrPvf**: Dark grey-green basaltic flows, possibly mafic to basaltic andesitic, thin-shelled bivalves (*Halobia* sp., *Monotis* sp.); limestone locally contains rare algal structures; may include coralline limestone near the top of the succession equivalent to Sutton limestone, Cowichan Lake area, southern Vancouver Island

**uTrPpm**: Thin interbeds of basaltic to andesitic volcanioclastic breccia (too small to show at map scale)

**Lower Karmutsen Formation: Pillow Member**: Dark grey-green, closely packed, pillowed basalt flows and localized, massive inflated flow lobes; typically aplinitic and non-amygdaloidal; may include inter-flow or rare thin lenses of well-bedded hyaloclastite dextritus;

**uTrK**: Small lens of dark grey, thin to medium bedded, carbonaceous mudstone and limestone, may contain fine-grained hyaloclastite dextritus;

## INTRUSIVE ROCKS

## EARLY TO MIDDLE JURASSIC (ca. 187.5 to 172.8 Ma) ISLAND PLUTONIC SUITE

**Jl**: Dark grey-green to pale pinkish grey, medium to coarse-grained, equigranular granitoid rocks and porphyry; includes hornblende-biotite-bearing diorite (di), quartz diorite (qd), quartz monzonite (qm), granodiorite (gd), tonalite (tn), gneiss (gn) and plagioclase-hornblende porphyry (pp);

**Jlag**: Agmatic: angular to rounded xenoliths of variably recrystallized Karmutsen volcanic rocks set in a medium-grained, granulated mesocratic

**Jld**: Dioritic phase of Beaver Cove Pluton

## Minor Intrusions LATE TRIASSIC TO EARLY JURASSIC

**TrBim**: Dark grey-green, andesitic autometavolcanic intrusion or dyke; associated with Bonanza Group volcanism

**Tn**: Small intrusion of dark grey-green, olivine-clinopyroxene-plagioclase porphyry coeval with mineralogically similar lavas in the lower part of the Bonanza Group (units uTrPvmo/uTrPvmc)

**Tc**: Conodont locality (age code as below; identification by M. J. Orchard)

**Tcp**: Fossil age designation: T Late Triassic; J Jurassic; e early m middle; i late

**Tn**: C Camrian; N Norian; (K) Kervian; (D) Davson; (L) Magnus; (Cb) Columbian; (R) Rutherford; (C) Cordilleran

**Conodont Zone:** (N) Nodosus; (P) Primitus; I lower; u upper; (no label indicates age indeterminate; combined codes indicate zone range)

**Geochronology:** U-Pb zircon date (Ma, 2 sigma error, determined by R. M. Friedman and J. K. Mortensen)

**Metamorphism:** Hornblende-hornfels facies: hornblende-plagioclase-epidote-quartz; Upper greenschist facies: actinolite-chlorite-albite-quartz eclogite; Prehnite-pumpellyite facies mainly: pumpellyite-hornfels-chlorite-albite-septaria-quartz-eclogite

**Mineralization:** Calc-silicate skarn (sulphide); Mantle-type deposit (massive sulphide)

**MINFILE locality (092L 038):**

**Topography:** Lake; Flooded land (swamp); Stream or river; Contour (100m); Spot height (m); Road (gravel); Road (paved); Rail line; Rail line (abandoned)

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**Digital Cartography:** G. T. Nixon

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