Stikine Terrane Cu, Cu-Au & Mo Porphyry Deposits
Exploration Undercover Workshop
Oct 12, 2011
Tectonic Setting
of Stikinia

Late Triassic Early Jurassic
Porphyry Cu, Cu-Mo, Cu-Au, and Mo Deposits Stikinia

2 main Episodes of BC Porphyry Formation
Stikinia

- Comprises 3 overlapping Island arc assemblages spanning 200 m.y.
  - Late Paleozoic Stikine, Middle to Late Triassic Stuhini or Takla, and Early to Middle Jurassic Hazelton groups

- These rocks are cut by coeval plutons; Late Triassic Stikine and Copper Mountain intrusive suites, Early Jurassic Texas Creek intrusive suite and Middle Jurassic Three Sisters intrusive suite

- The plutonic roots of this magmatic arc are exposed along the trend of the Stikine arch in NW Stikinia and the Skeena Arch in central Stikinia

- World class gold-rich deposits are associated with the Late Triassic, and Early Jurassic intrusive suites in NW Stikinia
Northwestern Stikinia

Paleozoic Stratigraphy

Stikine Assemblage
Iskut River

Logan et al. 2000
McClelland et al. 1993; Gunning, 1996

Marine Carbonate
Slope

Bimodal Volcanism
Proximal and Distal
Arc Flank Deposits

Submarine Arc
Fringing reefs

Magmatism

Submarine Arc
Fringing reefs

BC Ministry of Energy and Mines
Northwestern Stikinia

Mesozoic Stratigraphy

<table>
<thead>
<tr>
<th>Triassic</th>
<th>Jurassic</th>
<th>Cretaceous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late</td>
<td>Early</td>
<td>Late</td>
</tr>
<tr>
<td>Early</td>
<td></td>
<td>Mid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Late</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Early</td>
</tr>
</tbody>
</table>

- Triassic Late: Marine Basin Cherts
- Jurassic Early: Emerging Island Arc Fringing Reef
- Jurassic BCl: Back-Arc Basin Pillowed Basalt & Shale
- Jurassic SR: Emerging Volcano-Plutonic Arc
- Cretaceous Early: Marine Clastic Overlap Assemblage
- Cretaceous Mid: Nonmarine Westerly-Derived Clastic Wedge
- Cretaceous Late: Explosive Subaerial Felsic Volcanoeism
- Cretaceous Edziza: Subaerial Alkal Basalt Shield Volcano

Angular unconformity
### Triassic-Jurassic Cu-Au-Ag ±Mo Porphyries - NW Stikine Terrane

<table>
<thead>
<tr>
<th>Deposit</th>
<th>Reserves/Resources (Mt)</th>
<th>Cu (%)</th>
<th>Au (g/t)</th>
<th>Contained Au (M oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schaft Creek</td>
<td>1393</td>
<td>0.25</td>
<td>0.18</td>
<td>8.0</td>
</tr>
<tr>
<td>Galore Creek</td>
<td>785.7</td>
<td>0.50</td>
<td>0.29</td>
<td>7.3</td>
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<tr>
<td>Copper Canyon</td>
<td>152.6</td>
<td>0.30</td>
<td>0.52</td>
<td>2.5</td>
</tr>
<tr>
<td>Red Chris</td>
<td>619</td>
<td>0.38</td>
<td>0.36</td>
<td>7.1</td>
</tr>
<tr>
<td>Kemess*</td>
<td>232.7</td>
<td>0.15</td>
<td>0.39</td>
<td>2.9</td>
</tr>
<tr>
<td>Brucejack</td>
<td>297</td>
<td>-</td>
<td>0.86</td>
<td>8.1</td>
</tr>
<tr>
<td>Snowfield</td>
<td>1370</td>
<td>0.10</td>
<td>0.59</td>
<td>25.9</td>
</tr>
<tr>
<td>Kerr-Sulphurets-</td>
<td>2549</td>
<td>0.21</td>
<td>0.55</td>
<td>45.0</td>
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<tr>
<td>Mitchell (KSM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*past production grades calculated from metal produced (BCMINFILE)
Early Jurassic Cu-Au Porphyries - NW Stikine Terrane

KSM-Snowfield-Brucejack

- Early Jurassic high level bulk tonnage Cu-Au-Ag porphyries (K, S, M, Snowfield) & bonanza-grade Au-Ag epithermal veins (BJ)
- Associated w/ Early Jurassic (195 Ma) Hazelton volcanism, intrusions and characterized by large schistose pyritic gossans
- Post-mineral E-directed thrust faulting has dismembered the deposit

M+I Res
4216 Mt

Contained Cu
1,488,143 M lb

Contained Au
79.0 M oz

http://www.seabridgegold.net/resources.php
Stikine Porphyry Deposits

Distribution of porphyry deposits across Stikinia is directly related to the level of bedrock exposure and preservation:

- N of the Bowser Basin along the Stikine arch are L> to EJ calc-alkaline and alkaline Cu, Cu-Mo and Cu-Au-Ag porphyry deposits.

- In central Stikinia along the Skeena arch the deposits are Late Cretaceous to early Eocene calcalkaline Cu-Mo and Mo porphyry deposits and

- the latest Late Jurassic Mo deposit at Endako.
Central Stikine Terrane - Stratigraphy

MacIntyre, Villeneuve and Schiarizza, 2001
Late Jurassic Mo Porphyries - Central Stikine Terrane

Endako

- at 145 Ma is oldest porphyry Mo deposit in Cordillera and largest low-fluorine granodiorite-type
- hosted in Endako subsuite of Late Jurassic Francois Lake Plutonic Suite
- 2 ages of Mo mineralization spatially and genetically related to terminal stages of highly fractionated felsic magma
  - Endako 145 Ma
  - Nithi ~154 Ma

Reserves (Mt) | Mo (%) | Au (g/t)
---|---|---
340.3 | 0.046 | -
## Cretaceous Cu-Mo-Au Porphyries - Central & Southern Stikine Terrane

<table>
<thead>
<tr>
<th>Deposit</th>
<th>Reserves/Resources (Mt)</th>
<th>Cu (%)</th>
<th>Mo (%)</th>
<th>Au (g/t)</th>
<th>Contained Au (M oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glacier Gulch</td>
<td>77.2</td>
<td>-</td>
<td>0.16</td>
<td>-</td>
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<tr>
<td>Huckleberry*</td>
<td>88.9</td>
<td>0.46</td>
<td>0.004</td>
<td>0.02</td>
<td>-</td>
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<tr>
<td>Ox Lake</td>
<td>16.1</td>
<td>0.3</td>
<td>0.04</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Prosperity</td>
<td>831</td>
<td>0.23</td>
<td>-</td>
<td>0.41</td>
<td>10.9</td>
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<tr>
<td>Poison Mountain</td>
<td>280</td>
<td>0.26</td>
<td>0.007</td>
<td>0.14</td>
<td>1.2</td>
</tr>
<tr>
<td>Taseko</td>
<td>6.7</td>
<td>0.73</td>
<td>-</td>
<td>0.83</td>
<td>-</td>
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</tbody>
</table>

Huckleberry* past production Milled tonnes and grades calculated from metal produced 1997-2011 (BCMINFILE)

Huckleberry, 2000
Mid-Cret.-Eocene volcanic/magmatic evolution - central Stikinia

108-104 Ma
Rocky Ridge Volcanism
Skeena Gp.
submarine caldera
rhyolite domes
Sea level
magma

85-78 Ma
Kasalka
porph. andesite
lahar, breccia
Cu-Mo
Bulkley
porph. diorite
granodiorite

54-50 Ma
Newman
porph. andesite
lahar, breccia
Cu-Mo
Babine
porph. granodiorite
granodiorite, quartz
diorite

<50 Ma block faulting
Cu-Mo

Maclntyre and Villeneuve, 2001
## Eocene Cu-Mo-Au & Mo Porphyries - Central Stikine Terrane

<table>
<thead>
<tr>
<th>Deposit</th>
<th>Reserves/Resources</th>
<th>Cu (%)</th>
<th>Mo (%)</th>
<th>Au (g/t)</th>
<th>Ag (g/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bell Copper*</td>
<td>77.1</td>
<td>0.39</td>
<td>-</td>
<td>0.16</td>
<td>0.49</td>
</tr>
<tr>
<td>Granisle*</td>
<td>52.2</td>
<td>0.4</td>
<td>-</td>
<td>0.13</td>
<td>1.33</td>
</tr>
<tr>
<td>Morrison</td>
<td>224.2</td>
<td>0.6</td>
<td>0.004</td>
<td>0.16</td>
<td>-</td>
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<tr>
<td>Hearne Hill</td>
<td>4.2</td>
<td>0.6</td>
<td>-</td>
<td>0.18</td>
<td>-</td>
</tr>
<tr>
<td>Bell Moly</td>
<td>32.5</td>
<td>-</td>
<td>0.06</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kitsault</td>
<td>298.8</td>
<td>-</td>
<td>0.07</td>
<td>-</td>
<td>4.2</td>
</tr>
<tr>
<td>Lucky Ship</td>
<td>65.6</td>
<td>-</td>
<td>0.06</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Berg</td>
<td>557.8</td>
<td>0.3</td>
<td>0.03</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* Milled tonnes and grades calculated from past production (BCMINFILE)
Magmatic Axis Quesnel-Takla-Stuhini Arc

• The linear distribution of similar aged plutons marks the magmatic axis of the arc.

• In southern Quesnel the pattern is straightforward - belts extend parallel to continental margin and young eastward suggesting a westerly-facing arc.

• Triassic and Jurassic plutons in the NW display a more complicated pattern suggestive of large-scale folding and duplication of the highly prospective alkalic Copper Mtn intrusive belt.

• Bulkley intrusives define a probable south trending Late Cretaceous magmatic axis linking central Stikine Cu-Mo deposits (Huckleberry) with southern Stikine deposits (Prosperity, Poison Mtn)
The similar ages and episodic nature of magmatic activity in the northwest and central parts of Stikinia suggest an equal potential for mineral deposit formation elsewhere in Stikinia but to date this not been proven.

Are the older deposits preserved? and can we trace the highly prospective Triassic-Jurassic magmatic axis undercover? Hopefully the next couple of days will help answer these questions.

BC Ministry of Energy and Mines