What’s new for carbonate-hosted Zn-Pb deposits of the Kootenay Terrane, British Columbia?

S. Paradis, and G.J. Simandl
BMO suggests that Zn prices could hit US $1 per pound. They have risen from US$ 0.54/lb in January 2009 to US$ 0.93/lb on October 9, 2009.
Outline

- Introduction of Kootenay Arc
- Update on the seamless geoscience maps
- Some key scientific facts on the carbonate-hosted Zn-Pb sulphide deposits.
- What is there for you? …A surprise!
GSC OF 6213

http://gsc.nrcan.gc.ca/bookstore
http://gdr.nrcan.gc.ca/mirage/index_e.php

1:50K - NTS 082F6

- Carbonate-hosted Zn-Pb
- Skarn Zn-Pb
- Skarn Cu, Au, Mo
- Porphyry Cu, Au, Mo
Carbonate-hosted sulphide Zn-Pb deposits

- Geological resources: 6 to 10 Mt at 3-7% Zn, 1-5% Pb, 0.04% Cd and traces of Ag.

- Stratabound lenticular conc. of sulphides in folded dolomitized &/or siliceous carbonates.

- Mineralogy: Py, Sph, minor Ga, Po & Apy
  Gangue: Dolomite, calcite, quartz (± barite)

- Sulphides: Replacement of the host carbonates and open-space filling of voids.
From Macdonald (1973)
Age of carbonate-hosted Zn-Pb mineralization
Paragenesis

<table>
<thead>
<tr>
<th>Events</th>
<th>Pre-stage</th>
<th>Main-stage mineralization</th>
<th>Late-stage</th>
</tr>
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<tbody>
<tr>
<td>Sedimentation (marine sed)</td>
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<tr>
<td>Pyrobitumen</td>
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<tr>
<td>Dolomitization</td>
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<tr>
<td>Pyrite</td>
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<tr>
<td>Sphalerite, galena</td>
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<tr>
<td>Quartz</td>
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<tr>
<td>Deformation F1 and/or F2</td>
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<tr>
<td>Fracture- &amp; void-filling calcite</td>
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<tr>
<td>Deform., metamorphism, intrusion</td>
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<tr>
<td>Nonsulphides</td>
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</tbody>
</table>

Time

- Mid-Jurassic
- Mid-Jurassic to Mid-Cretaceous
- Miocene
Age of carbonate-hosted Zn-Pb mineralization

Evidences:

- Zn-Pb sulphides and dolomite envelop have been deformed - F1 and/or F2
- Phase 1 and 2 structures are sheared, faulted, and intruded by igneous bodies (mid-J, mid-K, Eocene)

Syngenetic/diagenetic = Lower Cambrian
  ➔ Irish- and/or Sedex

Epigenetic = pre-Mississippian or Jurassic
  ➔ MVT
Re-Os method

Genetic model(s)
Vectors & Exploration criteria
Sample 07-SP-21
Re-Os dating

Method:
13 Analyses of pyrite from stratabound Py-Sph-Ga, O’Donnell orebody, Reeves MacDonald mine

Results:
- Extremely high Re and Os abundances:
- Re = 275-1074 ppb, Os = 3.9 to 16.8 ppb

<table>
<thead>
<tr>
<th>Sample</th>
<th>Re ppb</th>
<th>± 2σ</th>
<th>Total Os ppt</th>
<th>± 2σ</th>
<th>187Re/188 Os</th>
<th>± 2σ</th>
<th>187/188 Os</th>
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Ordovician 413 ± 92 Ma
Devonian
360 ± 78 Ma
Pb isotopes
What does this mean for you!

• **Re/Os:** Ordovician to Devonian → MVT deposits.

• **Devonian** was characterized by the blossoming of igneous activity and mineralization.

• **Ages** → More complete understanding of the origin of the KA deposits, and the processes necessary for their formation.
Carbonate-hosted massive sulphides

Devonian

Seamless geological maps:
Salmo 82F03 = GSC OF 6048
Nelson 82F06 = GSC OF 6213

Carbonate-hosted nonsulphide deposits
BC Geological fieldwork 2008, 2009
BC Geofile 2009-4, 2010-X
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