<table>
<thead>
<tr>
<th>Location / District</th>
<th>Age / setting</th>
<th>Size* / metals / alteration</th>
<th>Comments</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Canzonic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Sea region (Afar, Atlantis II)</td>
<td>Holocene / rift-transform setting with basaltic volcanism and abundant evaporites</td>
<td>&gt;100 (&gt;157) / FeOx + MnOx in sediments with modern Fe-rich hot springs or (Zn-Cu-Pb brines) / local sodic ± peralkaline alteration</td>
<td>Modern geothermal circulation through evaporite beds leading to syngenetic FeOx + Zn+Pb sulfides</td>
<td>Bonatti et al. (1972); Zierenberg and Shanks (1983)</td>
</tr>
<tr>
<td><strong>Mesozonic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basin &amp; Range province, USA (Humboldt complex; Cortez Mts.)</td>
<td>Jurassic / extensional or back-arc mafic or felsic volcanoplutonic complexes</td>
<td>&gt;1,000 (&gt;75) / FeOx in &gt;40 occurrences, ± minor REE &amp; Cu / regionally extensive sodic ± peralkaline alteration</td>
<td>Arid paleoclimate, evaporites in region; variable S (locally heavy); VMS in same arc</td>
<td>Battles and Barton (1995); Johnson et al. (1993); Muffler (1964)</td>
</tr>
<tr>
<td><strong>Venezuelan</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Brazilian</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cretaceous</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Transvaal, RSA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Triassic-Jurassic</strong></td>
<td>mafic sill in early Mesozoic basins</td>
<td>&gt;350 (&gt;100) / FeOx ± minor Cu, Co (± U) in &gt;100 occurrences / skarn and sodic alteration</td>
<td>Deposits in northern half of rift with red beds &amp; minor evaporites; evidence for evaporite source</td>
<td>Robinson (1988); Rose et al. (1985)</td>
</tr>
<tr>
<td><strong>Siberian Platform, Russia (Krasnoyarsk, Korshunovsk)</strong></td>
<td>Perm Triassic / mafic flows and intrusions in flood basalt province</td>
<td>&gt;3,000 (&gt;650) / FeOx + minor Cu, anhydrite &amp; halite in &gt;150 deposits / skarn and sodic alteration</td>
<td>Interaction of dolerites with Cambrian salts (&gt;0.5 km); geochemical evidence for evaporite involvement</td>
<td>Smirnov (1977); Vakhрушев et al. (1981); Vakhrushev and Ryabkov (1984); Yudina et al. (1977)</td>
</tr>
<tr>
<td>Location</td>
<td>Age/Type Description</td>
<td>Characteristics</td>
<td>References</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td></td>
</tr>
<tr>
<td>Turgai province, Kazakhstan</td>
<td>Carboniferous / mafic-intermediate arc volcano-plutonic complex</td>
<td>&gt;4,000 (&gt;1,500) / FeOx + minor Cu, Co, MnOx / extensive sodic ± minor potassic alteration &amp; skarn</td>
<td>Kochergin (1985); Smirnov (1977); Zonenshain et al. (1990)</td>
<td></td>
</tr>
<tr>
<td>Altai-Sayan, central Asia</td>
<td>Mid-Paleozoic / volcano-plutonic complexes (mafic-felsic), redbeds</td>
<td>&gt;2,000 (&gt;500) / FeOx ± significant REE, Cu, U in &gt; 25 occurrences / extensive sodic alteration and skarn</td>
<td>Prikhod'ko (1987); Smirnov (1977); Zharkov (1984)</td>
<td></td>
</tr>
<tr>
<td>Central Iran</td>
<td>Cambrian (and younger) / anorogenic felsic volcanic successions</td>
<td>&gt;2,500 (&gt;1,000) / FeOx ± Cu ± REE in stratiform &amp; cross-cutting bodies in &gt; 25 occurrences/ sodic ± peralkaline ± minor potassic alteration</td>
<td>Förster (1990); Förster and Jafarzadeh (1994); Muecke and Younessi (1994)</td>
<td></td>
</tr>
<tr>
<td>Northwestern Canada (Great Bear, Wernicke Mtns.)</td>
<td>Early &amp; mid-Proterozoic intermediate arc-like volcano-plutonic centers</td>
<td>&gt;50? (&gt;10?) / FeOx ± Cu, U, Ag, Co in &gt; 25 occurrences / regionally extensive sodic ± minor potassic alteration</td>
<td>Badham (1978); Bell (1978); Hildebrand (1986); Hitzman et al. (1992); Laznicka and Edwards (1979)</td>
<td></td>
</tr>
<tr>
<td>Stuart Shelf, South Australia (Olympic Dam, Acropolis, Emmie Bluff)</td>
<td>Mid-Proterozoic / extensional anorogenic(?)/ felsic-mafic(?)/ volcanic-plutonic sequence</td>
<td>&gt;3,000 (&gt;2,000) / FeOx + major Cu, REE, U, Au in &gt;5 deposits / ± minor potassic alteration</td>
<td>Gow et al. (1994); Parker (1990); Reeve et al. (1990); Oreskes and Einaudi (1992)</td>
<td></td>
</tr>
<tr>
<td>Northern Sweden (Kiruna, Svappavaara, Ekstromberg, Gallivare)</td>
<td>Mid-Proterozoic / mafic-felsic volcanic sequence, possibly extensional</td>
<td>&gt;5,000 (&gt;2,000) / FeOx + minor Cu, REE, Au, U in &gt;20 deposits / regional sodic ± peralkaline ± minor potassic alteration</td>
<td>Geijer and Odman (1974); Hitzman et al. (1992); Parak (1975)</td>
<td></td>
</tr>
<tr>
<td>Bayan Obo, Inner Mongolia</td>
<td>Mid-Proterozoic(?)/ overprinted(?) by Paleozoic / felsic sediments &amp; dolomites, younger granitoids</td>
<td>1,000 / FeOx + major REE in stratabound orebodies / extensive sodic ± peralkaline ± minor potassic alteration</td>
<td>Chao et al. (1992); Hauck (1990)</td>
<td></td>
</tr>
<tr>
<td>Northeastern USA (Benson mines, Mineville, Dover)</td>
<td>Mid-Proterozoic / intermediate-felsic anorogenic suite overprinted &amp; intruded by Grenville granitoids</td>
<td>&gt;1,000 (200) / FeOx + REE ± minor Cu, U, Au in &gt;30 occurrences as discordant and stratabound orebodies / extensive sodic ± peralkaline alteration &amp; skarn</td>
<td>Buddington (1966); Sims (1958); Whitney and Olmsted (1988)</td>
<td></td>
</tr>
<tr>
<td>Bihar-Orissa area, India</td>
<td>Mid-Proterozoic / mafic-intermediate igneous complex</td>
<td>&gt;? (?) / FeOx ± zoned REE, Cu, U in &gt;15 occurrences with discordant and stratabound ores / extensive sodic ± minor potassic alteration</td>
<td>Banerji (1962); Banerji (1961)</td>
<td></td>
</tr>
<tr>
<td>Southeastern Missouri, USA (Pea Ridge, Boss-Bixby, Pilot Knob)</td>
<td>Mid-Proterozoic / anorogenic felsic province</td>
<td>&gt;1000 (&gt;300) / FeOx ± Cu ± REE, U, Au in &gt; 25 occurrences / minor sodic and potassic alteration known</td>
<td>Emery (1968); Panno and Hood (1983); Pratt and Sims (1990)</td>
<td></td>
</tr>
</tbody>
</table>

*In millions of tonnes; first number is total district resource, numbers in parantheses are tonnages for largest deposit within the district.
REFERENCES CITED:
Hildebrand, R. S., 1986, Kiruna-type deposits; their origin and relationship to intermediate subvolcanic plutons in the Great Bear magmatic zone, Northwest Canada: Economic Geology, v. 81, p. 640-659.


Muecke, A., and Younessi, R., 1994, Magnetite-apatite deposits (kiruna-type) along the Sanandaj-Sirjan zone and in the Bafq area, Iran, associated with ultramafic and calcalkaline rocks and carbonatites: Mineralogy and Petrology, v. 50., p. 219-244.


Parak, T., 1975, Kiruna iron ores are not "intrusive-magmatic ores of the Kiruna type": Economic Geology, v. 70, p. 1242-1258.


Vivallo, W., Henriquez, F., and Espinoza, S., 1994, Oxygen and sulfur isotopes in hydrothermally altered rocks and gypsum deposits at el Laco mining district, northern Chile: Comunicaciones, v. 45, p. 93-100.


Zhang, R., 1986, Sulfur isotopes and pyrite-anhydrite equilibria in a volcanic basin hydrothermal system of the Middle to Lower Yangtze Valley: Economic Geology, v. 81, p. 32-45.

