Lithogeochemical classification of hydrothermally altered Paleoproterozoic plutonic rocks associated with gold mineralization: examples from South Greenland and Northern Sweden

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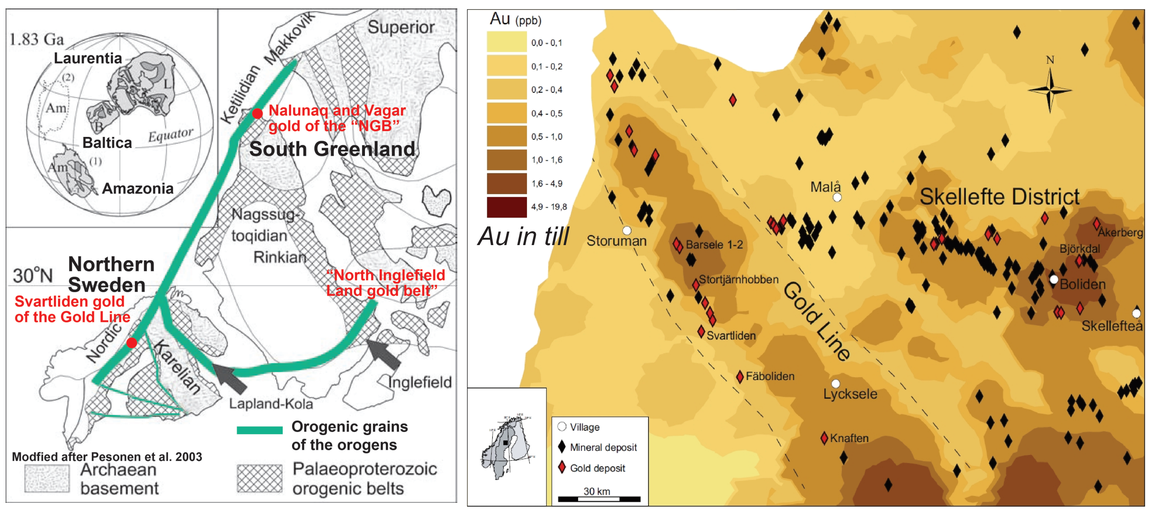
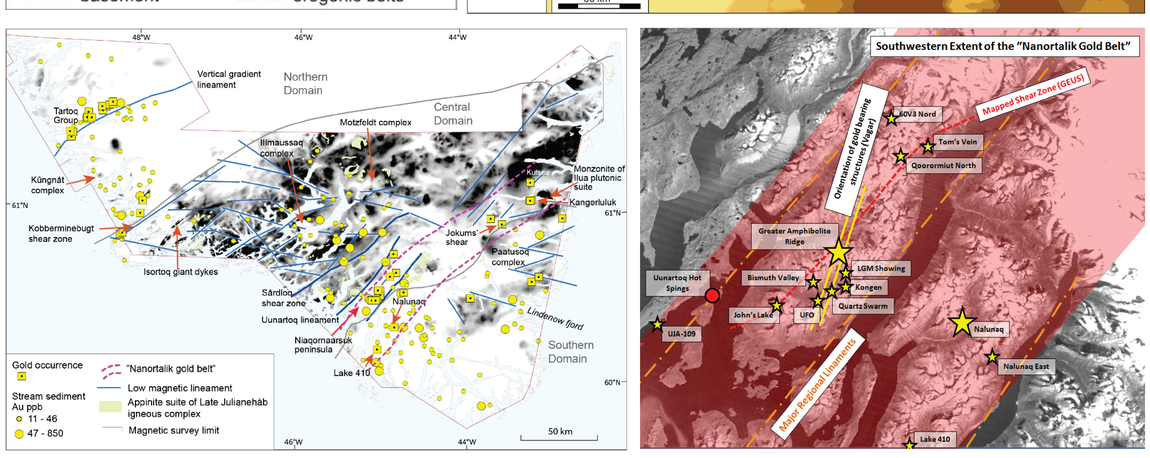
Lithogeochemical classification of rock types and alteration styles is well established for volcanic rock. Suitable classification diagrams for altered plutonics rocks, particularly granitoids, are lacking, with the literature biased towards the least altered examples. In this contribution, we dicuss how can altered plutonic rocks be classified on basis of immobile elemets using examples of heavily altered granitoids from Greenland and Sweden. The preliminary classification based on as Zr and Y discriminate the calc-alkaline granodiorite at Vagar, and samples from the Svartliden, and Fäbodtjärn intrusions. Classification based on Al/Ti and Zr/Al ratios allow discrimination of granitoids from different areas, and reveal two geochemically distinct granodiorite suites at Vagar, not apparent from diagrams using major oxides.

Location and geological settings

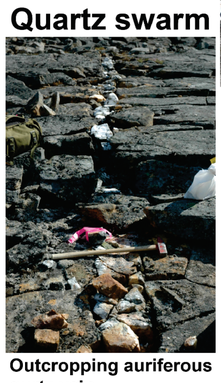




Vagar, Greenland

Amphibolite ridge

Quartz swarm

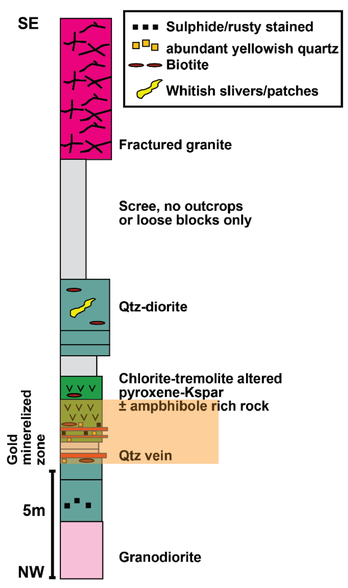


Outcropping auriferous qurtz vein, 0.6m @ 11.9 ppm Au)

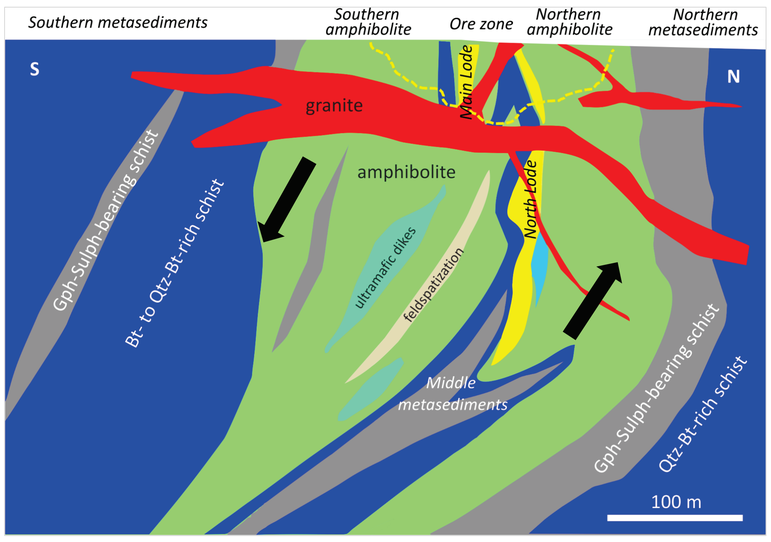
Vein 1: ~1 m thick and samples up to 24 ppm Au and VG

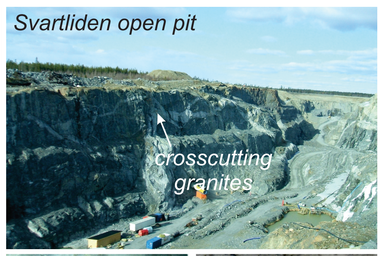
Vein 2: channel samples with up to 11 metres @ 80.2 ppm Au and VG

Vein 2 profile at 810m

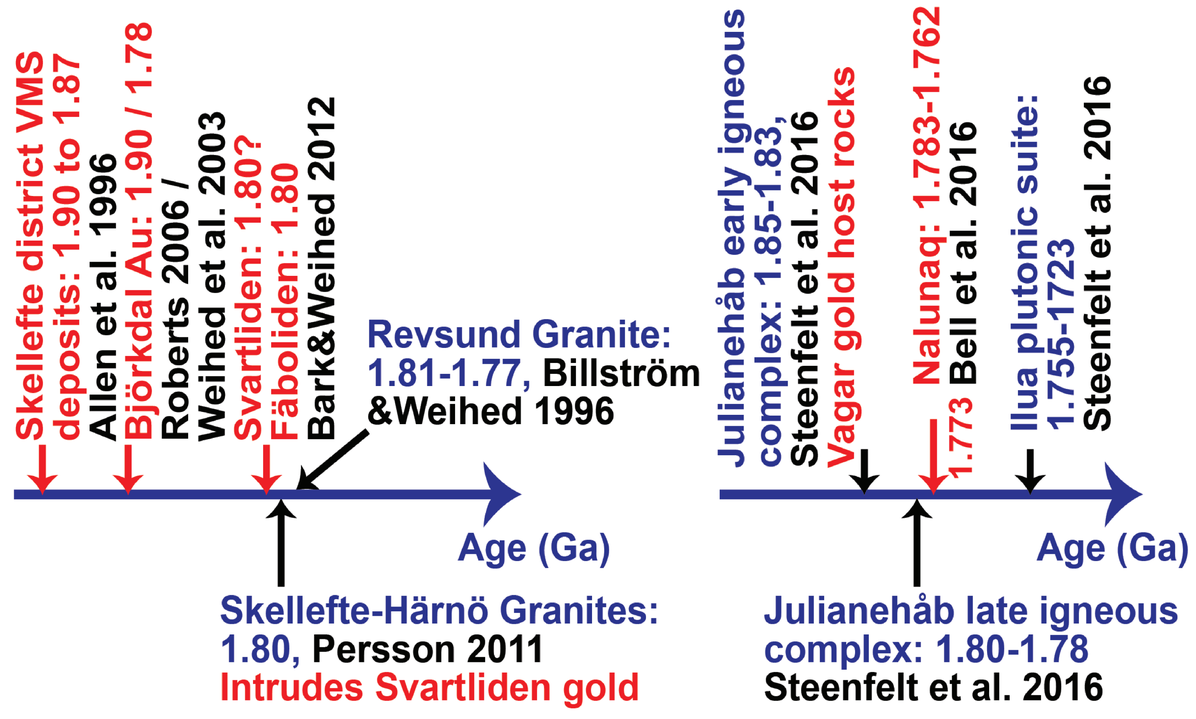


Svartliden, Sweden



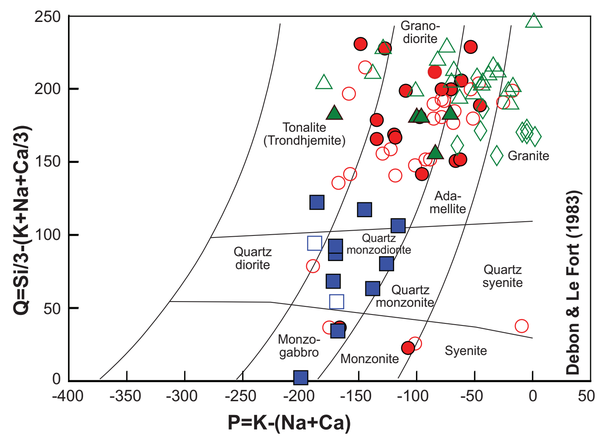


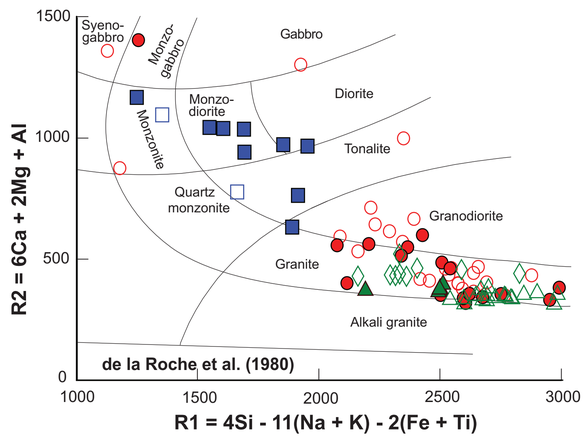
Time relation of the orogenic events and gold introduction

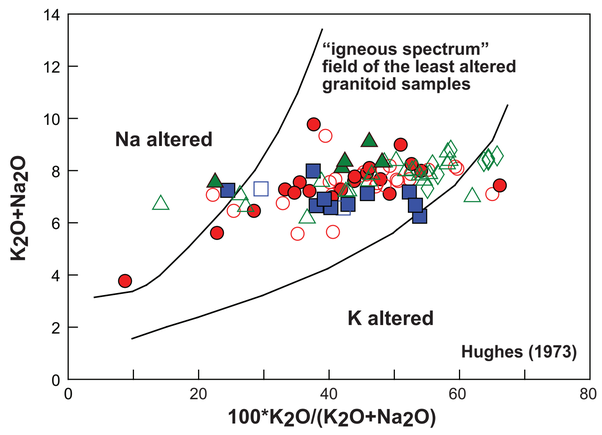


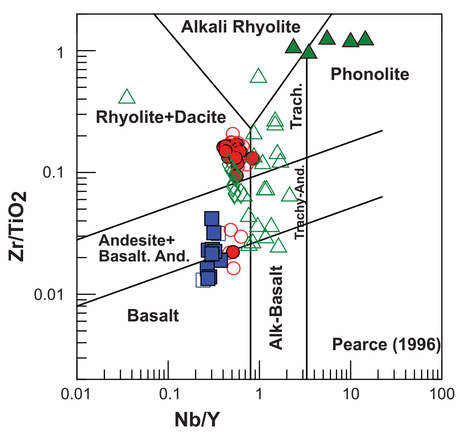
Interpretation of lithogeochemical results

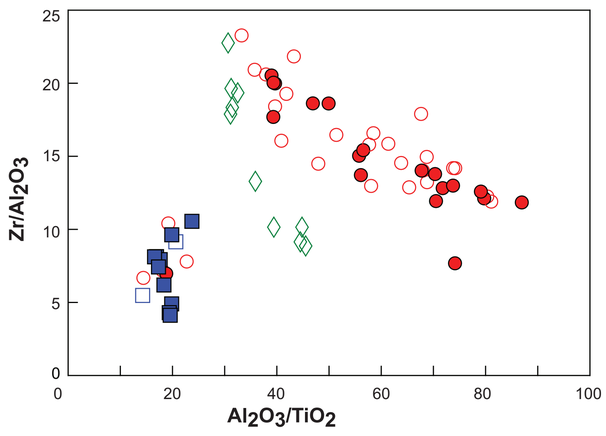
Major vs. trace and immobile elements

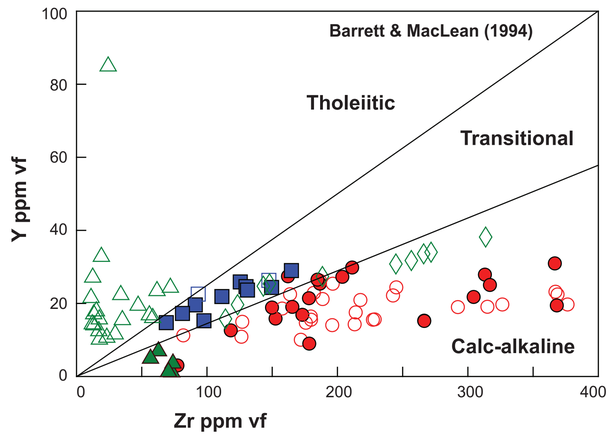












- Vagar granitoid ≥ 20 ppb gold (20 samples)
- Vagar granitoid < 20 ppb gold (27)
- Fäbodtjärn granodiorite ≥ 20 ppb gold (10)
- Fäbodtjärn granodiorite < 20 ppb gold (2)
- Svartliden altered granite ≥ 20 ppb gold (5)
- Svartliden Skellefte-Harnö granite < 20 ppb gold (20)
- Svartliden Revsund granite < 20 ppb gold (10)

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