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Evidence of lateral thermomechanical erosion of basalt by Fe-Ni-Cu sulfide melt at Kambalda, Western Australia

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Supplementary data

Table DR1: analyses of chromite grains.

Fig DR1 – geological map of Kambalda.

Fig DR2 - photomicrographs of skeletal chromite – amphibole-sulfide intergrowths.

Animation - Movie DR1: moving slices through grey-scale 3D medical computed tomography image of the sample illustrated in Figure 2C. Original top is to the left. Sulfide is the brightest grey phase, basalt darkest. The layer of mixed sulfide and skeletal chromite forms an intermediate grey layer in the centre of the image. About half way through the animation, irregular mushroom-shaped basaltic melt plumes rimmed by sulfide-chromite can be seen.

Table DR1

Representative chromite data (in weight percentage and atoms per formula unit based on 4 oxygen per formula unit) of basal contact chromite (formed around a rising basalt melt plume) and upper pinchout chromite (graphically intergrown with amphibole and pyroxene). Data were collected using a MIRA3 TESCAN at CSIRO in Perth, Western Australia

Sample	Basal contact #23	Basal contact #24	Basal contact #25	Upper contact #46	Upper contact #51	Upper contact #63
SiO ₂	0.15	b.d.	0.13	b.d.	b.d.	0.13
TiO ₂	0.85	1.24	0.90	0.47	0.87	1.22
V ₂ O ₅	0.29	0.48	0.55	0.52	0.50	0.48
Al ₂ O ₃	4.25	0.79	0.53	2.72	1.27	0.57
Cr ₂ O ₃	54.8	54.1	53.2	50.9	53.7	54.8
FeO _{tot}	36.2	40.5	41.2	39.6	38.7	39.5
MnO	2.62	2.80	2.81	2.73	2.36	2.48
MgO	b.d.	b.d.	b.d.	b.d.	b.d.	b.d.
CoO	b.d.	b.d.	b.d.	b.d.	b.d.	b.d.
NiO	0.05	b.d.	0.14	b.d.	b.d.	b.d.
ZnO	1.86	1.40	1.35	2.88	2.71	2.69
Total	101.08	101.27	100.85	99.86	100.11	101.80
Al	0.2	0.0	0.0	0.1	0.1	0.0
Cr	1.6	1.6	1.5	1.5	1.6	1.6
Fe ²⁺	0.9	0.9	0.9	0.9	0.9	0.9
Fe ³⁺	0.2	0.3	0.4	0.4	0.3	0.3
Mn	0.1	0.1	0.1	0.1	0.1	0.1
Zn	0.0	0.0	0.0	0.1	0.1	0.1
O	4	4	4	4	4	4
Total	7.0	7.0	7.0	7.0	7.0	7.0

Figure DR1

Simplified map of Kambalda showing the location of Moran within the Long channel on the eastern flank of the Kambalda Dome.

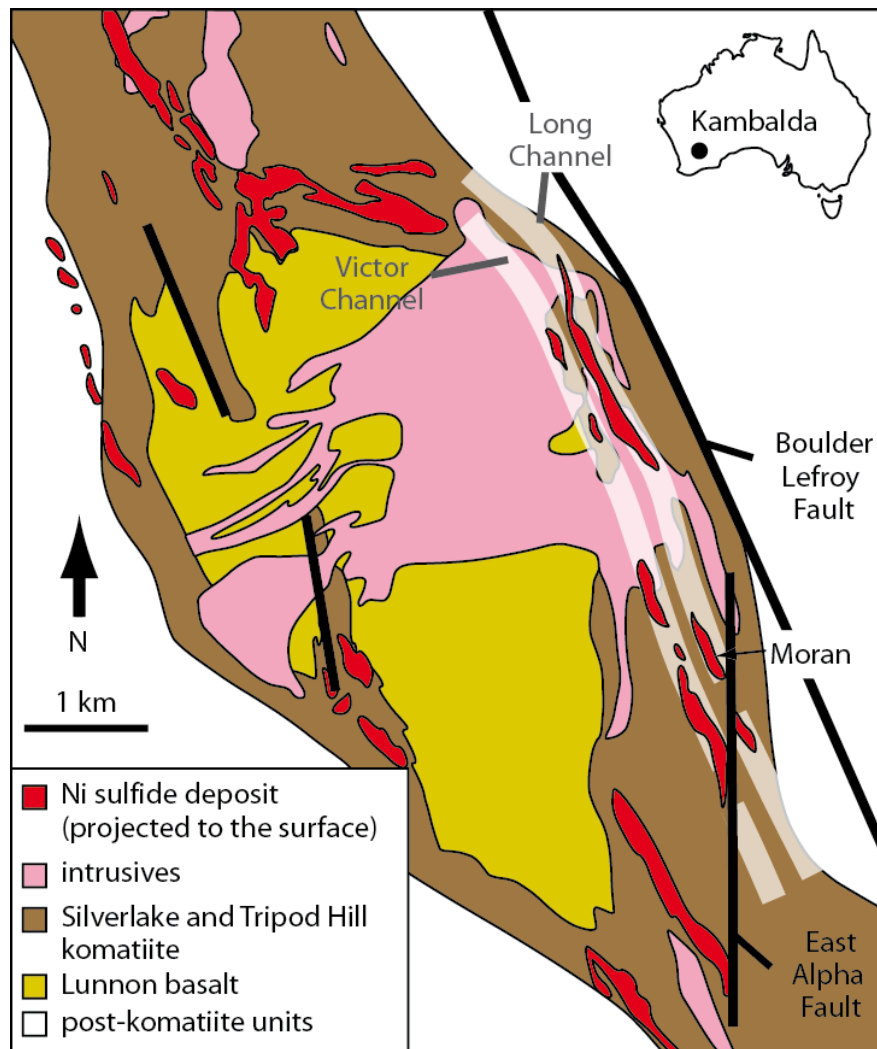


Figure DR2

Hand specimen (A) and photomicrographs of polished section of the chromite-actinolite intergrowth of the upper sulfide-basalt contact. The section is cut perpendicular to the c-axis of the amphiboles. The scale bar in (B) is 500 μ m wide and photo is taken in air. Note, that ferrichromite is intergrown with silicates and with sulfides. In (C) the scale bar is 50 μ m wide and photo is taken in oil immersion.

