[Tectonics]

Supporting Information for

[Neoarchean synmagmatic crustal extrusion in the transpressional Yilgarn Orogen]

[Zibra, I.[1,2], Weinberg, R.F.[2], Peternell, M.[3]]

[1: Geological Survey of Western Australia. 2: Monash University. 3: University of Gothenburg]

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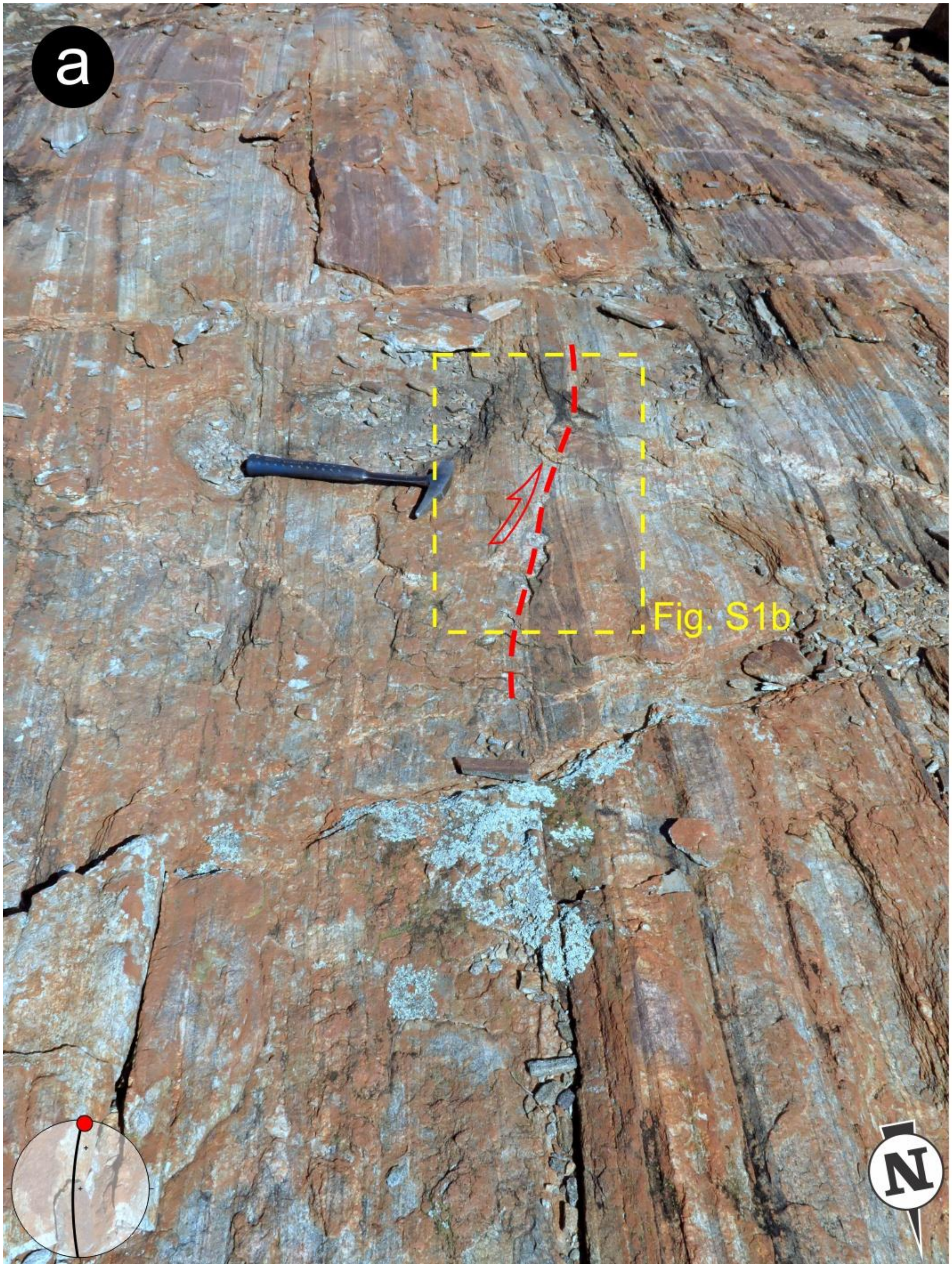
Introduction

This Supporting Information file contains three additional figures that are used to support our discussion and conclusions. Figure S1 illustrates the typical meso-scale appearance of melt-present deformation on the Ballard gneiss. Figure S2 shows the outcrops from the Ballard mylonite that were used to calculate the shear strain from foliation boudinage structures (FBS). Figure S3 illustrates the variety of microstructures in garnet porphyroblasts developed along the boundary between felsic schist and amphibolite.


a
Fig. S1b
N

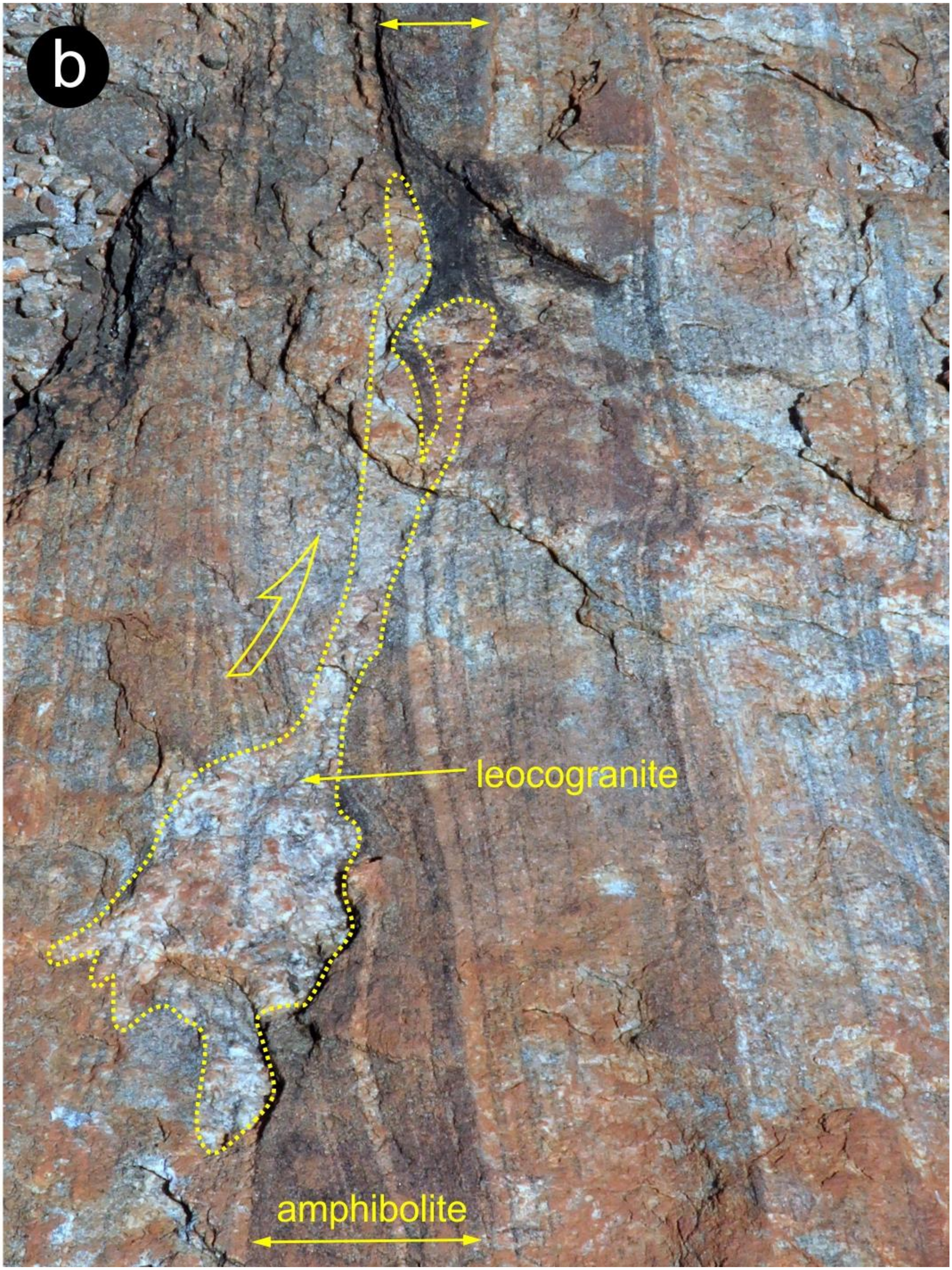
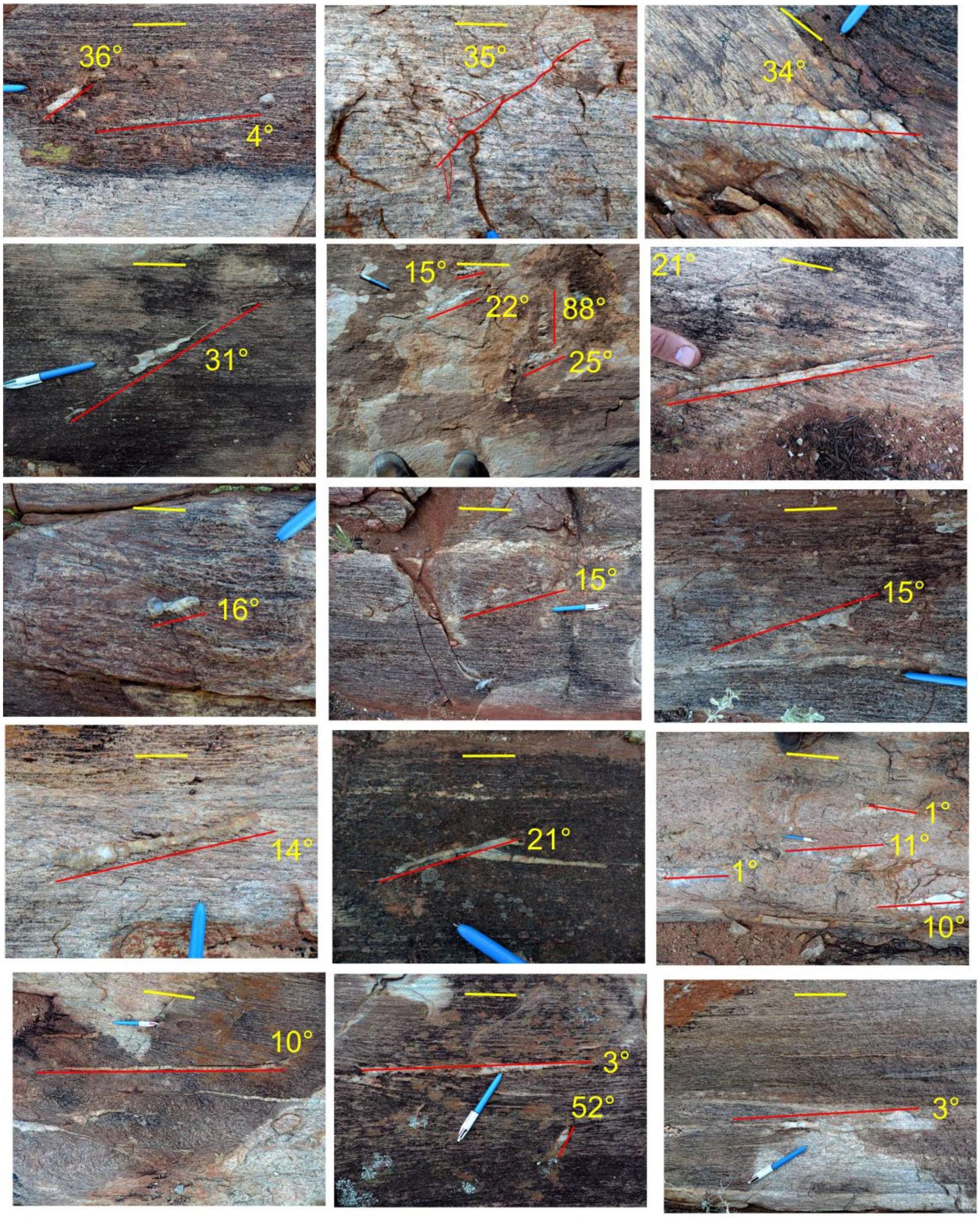
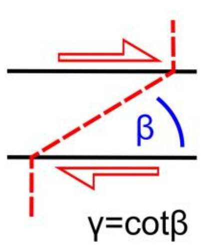

b
leocogranite
amphibolite

Figure S1. Horizontal exposure of layered granite gneiss from the northern portion of the Ballard gneiss (Fig.1 for location). The layering is defined by variations in composition of the granitic sheets, and by sheared amphibolite slivers. (a) Dextral, synthetic shear band nucleated along a boudinaged amphibolite sliver. (b) Close-up view from (a) showing a leucogranite patch aligned with the shear band. Leucogranite is interpreted to represent former melt that migrated along the shear band during boudinage.


36°
4°
35°
34°
31°
15°
22°
88°
25°
21°
16°
15°
15°
14°
21°
1°
11°
1°
10°
10°
3°
52°
3°


β
γ=cotβ

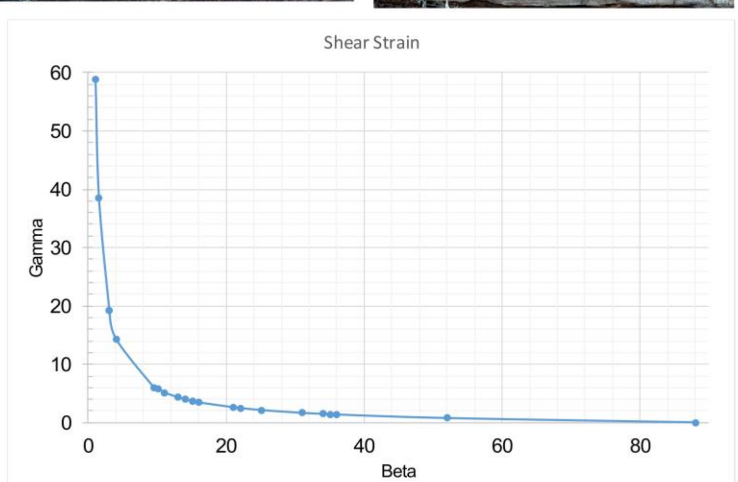

Shear Strain
Gamma
Beta
0
10
20
30
40
50
60
0
20
40
60
80

Figure S2. Shear strain estimates, using Ramsay and Graham (1970) equations for initial orientations where cot β= 0, plotted on a shear strain, α/β angle curve for reoriented veins from the Ballard mylonite. The field photographs show the 15 outcrops from which β was calculated. β is the angle (measure clockwise) between the trace of S_{MYL} (indicated by the yellow lines) and the long axes of FBS (red lines).

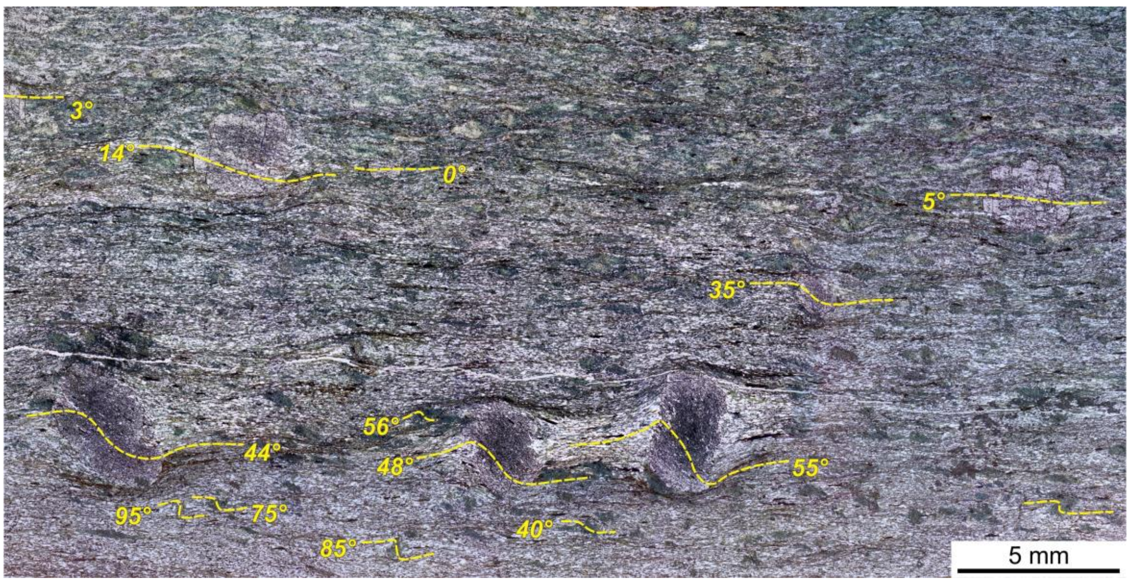


Figure S3. Thin section micrograph centred along the boundary between quartz-biotite schist (bottom) and garnet amphibolite. Garnet and hornblende porphyroblasts, which are developed on both sides of the lithological boundary, show an internal foliation (Si) concordant with the matrix foliation Se. The sigmoidal Si pattern implies of dextral porphyroblast rotation with respect to Se. the amount of rotation markedly decreases from the felsic to the mafic layer, reflecting grain-scale kinematic strain partitioning between zones of dominant coaxial and non-coaxial deformation.

β γ

1	58.82
2	38.46
3	19.20
3	19.20
4	14.29
10	5.99
10	5.88
11	5.15
13	4.34
13	4.34
14	4.01
15	3.70
15	3.70
16	3.45
21	2.63
22	2.50
25	2.15
31	1.66
34	1.49
35	1.42
36	1.37
52	0.78
88	0.03

Table S1. Table listing the values of γ calculated ($\gamma=\cot\beta$) from the angles β, which were measured from the field photographs shown in figure S3.