

Table S1. Amphibole average compositions (wt%; unpublished data from the study of Spengler et al., 2023).

Sample type	Opx-free eclogite	
Sample no.	DS1438	
Grain type	lamellae	matrix
<i>n</i>	6	4
SiO ₂	46.9	45.0
TiO ₂	0.22	0.06
Al ₂ O ₃	15.4	17.0
Cr ₂ O ₃	0.12	0.08
FeO	2.69	4.37
MnO	0.01	0.05
MgO	17.7	16.8
CaO	12.6	12.1
Na ₂ O	2.50	2.47
K ₂ O	0.02	0.14
H ₂ O ⁺	1.74	1.72
F	0.87	0.89
Cl	0.00	0.01
Total	100.5	100.2
<i>Cations per 24 O</i>		
Si	6.469	6.298
Ti	0.023	0.007
Al	2.513	2.798
Cr	0.013	0.009
Fe ²⁺	0.311	0.512
Mn	0.001	0.006
Mg	3.650	3.499
Ca	1.873	1.815
Na	0.672	0.670
K	0.004	0.024
OH	1.617	1.605
F	0.382	0.393
Cl	0.001	0.001
Total	15.556	15.638
Species	Prg	Prg

Amphibole classification after Locock (2014),
detection limit for K was 160–180 µg g⁻¹

Table S2. Integral absorbance and analytical uncertainty from repeated analyses of a raw spectrum shown normalised in Figure 3a.

Parameter	Analysis	Cpx in sample M65
A_i (bands 1–3) (cm^{-1})	#1	12.717
	#2	13.282
	#3	12.907
	#4	13.375
	#5	13.186
	#6	13.258
	#7	13.372
	#8	12.281
	#9	13.012
	#10	13.534
σ (cm^{-1})		0.375
σ (%)		2.86

Table S3. Selected molar ratios and compositional endmembers of mineral core average compositions (Spengler et al., 2023).

Sample	Cpx		Opx	Grt	
	Mg#	Jd	Mg#	Mg#	Grs
<i>Opx-bearing eclogite</i>					
2-4A	0.909	0.099	0.870	0.650	0.101
DS0326	0.772 – 0.774	0.051 – 0.099	0.836	0.601	0.115
DS1409	0.744 – 0.749	0.256 – 0.260	0.739	0.471	0.094
DS2216	0.837	0.049	0.796	0.567	0.155
M65	0.870 – 0.876	0.151 – 0.214	0.840	0.619	0.105
<i>Opx-free eclogite</i>					
DS1438	0.943 – 0.945	0.133 – 0.143		0.743	0.322
DS1405	0.792 – 0.799	0.279 – 0.302		0.469	0.214
DS2204	0.826 – 0.835	0.073 – 0.091		0.328	0.245
DS2217	0.644 – 0.656	0.000 – 0.008		0.233	0.219
UL-96-2	0.830 – 0.833	0.443 – 0.463		0.429	0.294

Mg# = $\text{Mg}/(\text{Mg} + \text{Fe}^{\text{total}})$, Grs = $\text{Ca}/(\text{Mg} + \text{Mn} + \text{Ca} + \text{Fe}^{\text{total}})$

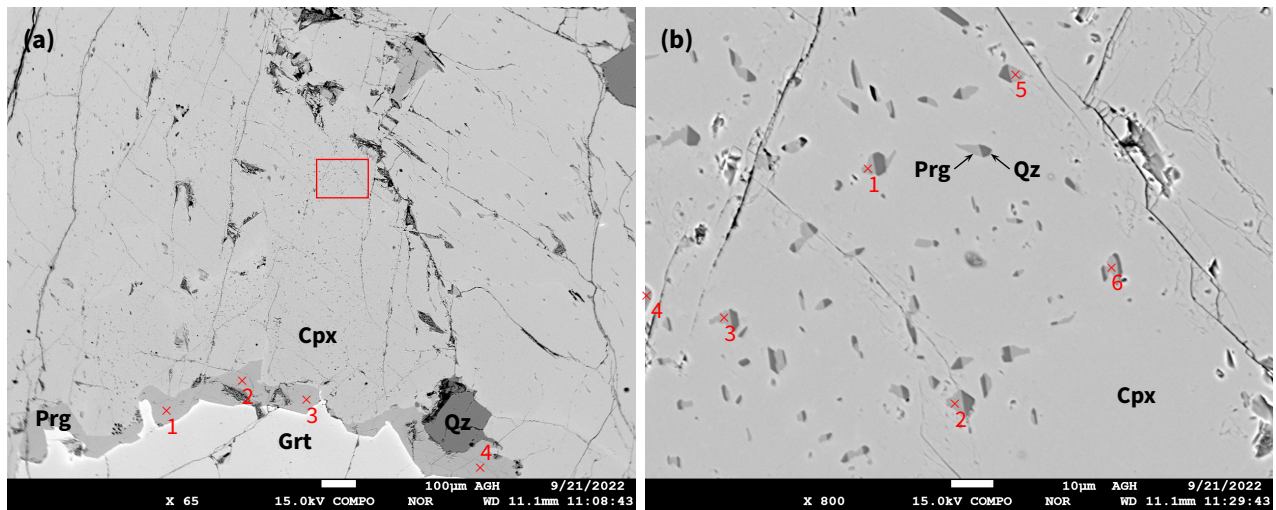


Figure S1. Backscattered electron images of Fjortoftvika eclogite DS1438 showing Prg in two textural positions: (a) at grain boundaries between Cpx and Grt and (b) as inclusions in Cpx in close spatial association with Qz. The frame in panel a outlines the position of the image shown in panel b. The labelled crosses mark the position of the mineral chemical analyses, which are shown as average compositions in Table S1.

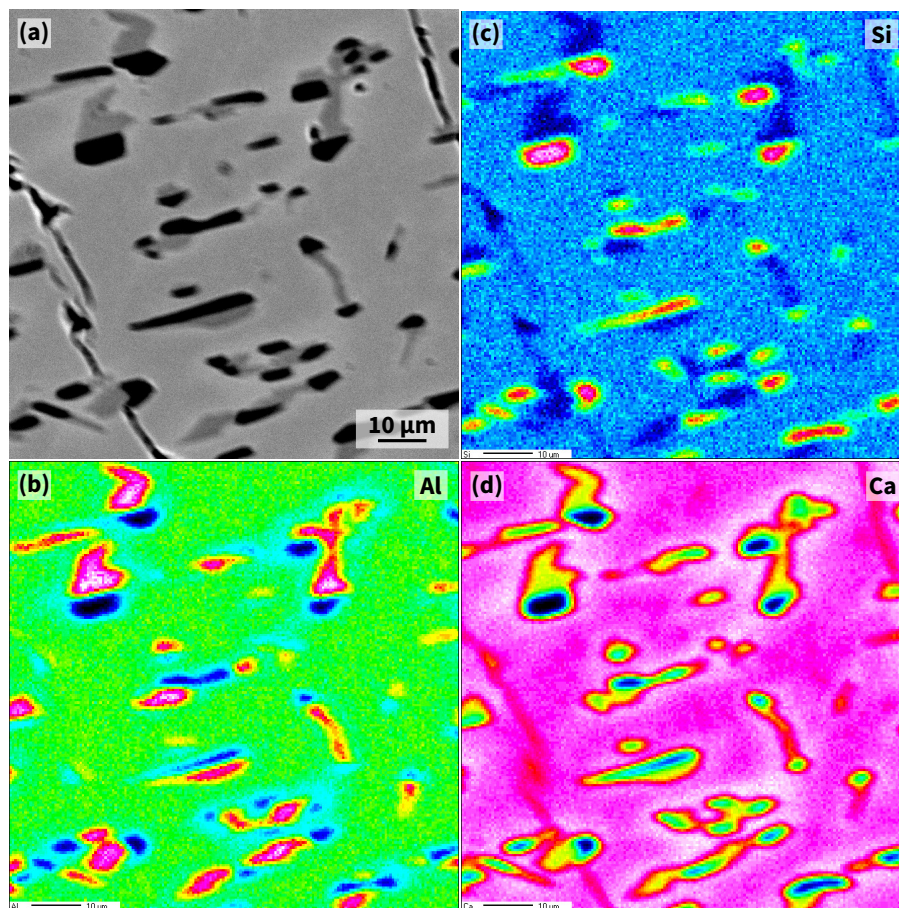


Figure S2. Oriented inclusion in Cpx from Korveneset eclogite M65. (a) Backscattered electron image that shows a cross-section surface of part of a Cpx grain (lightgrey) with oriented lamellae a few μm in width of Prg (darkgrey) and Qz (black). (b–d) Compositional maps of the area shown in panel a for Al, Si and Ca (false-colour images, element concentration increases along the colour changes black–blue–green–red–white).

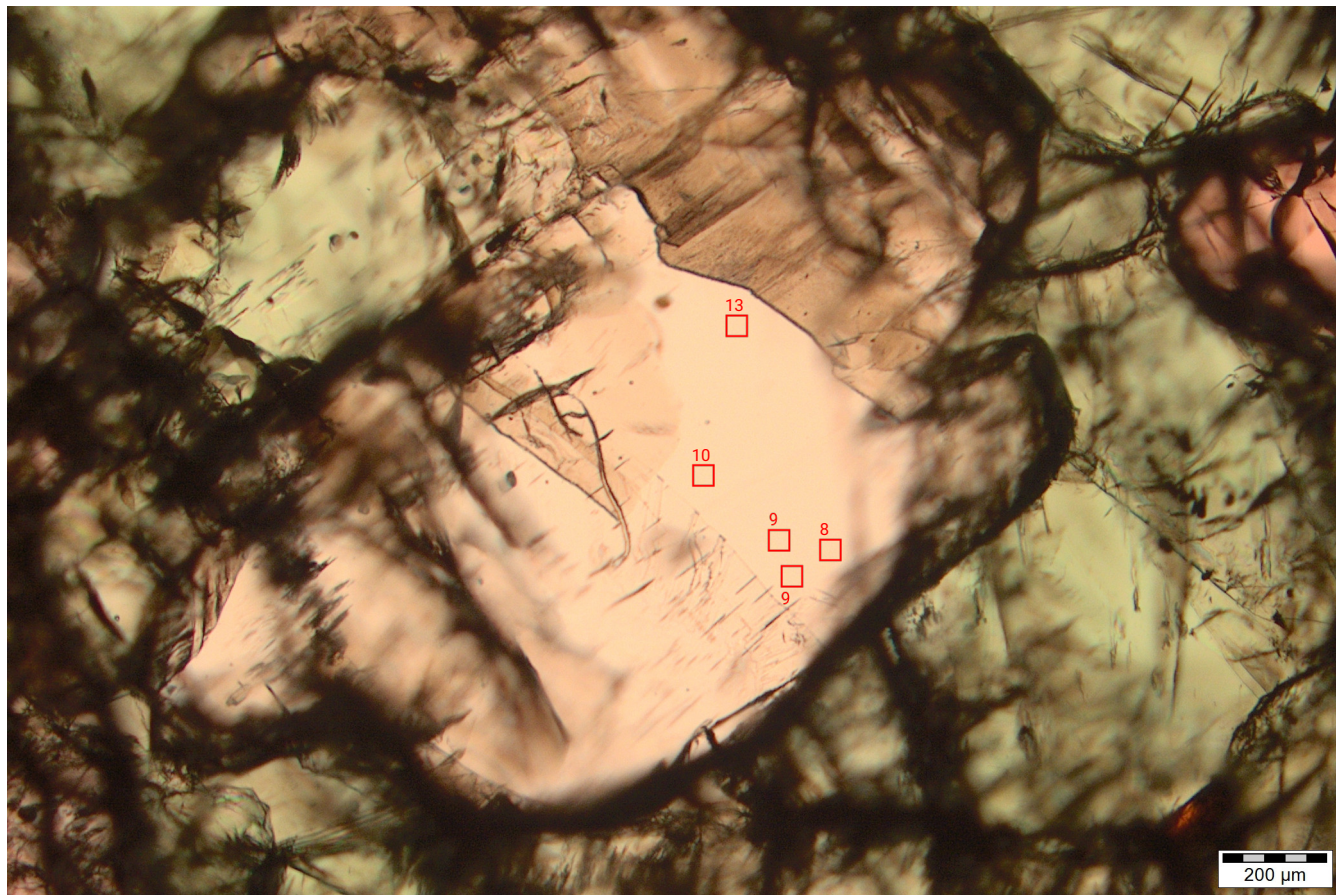


Figure S3. Photographic image (PPL) of a polished rock slab with a thickness of 463 μm from sample 2-4A showing an Opx grain (centre) with areas (squares) analysed by FTIR spectroscopy. The numbers refer to the amount of structural hydroxyl (in $\mu\text{g g}^{-1}$) quantified within the analytical areas using the calibration of Bell et al. (1995) and have an error propagated uncertainty (1σ) of 5.1 % (see Methods section).

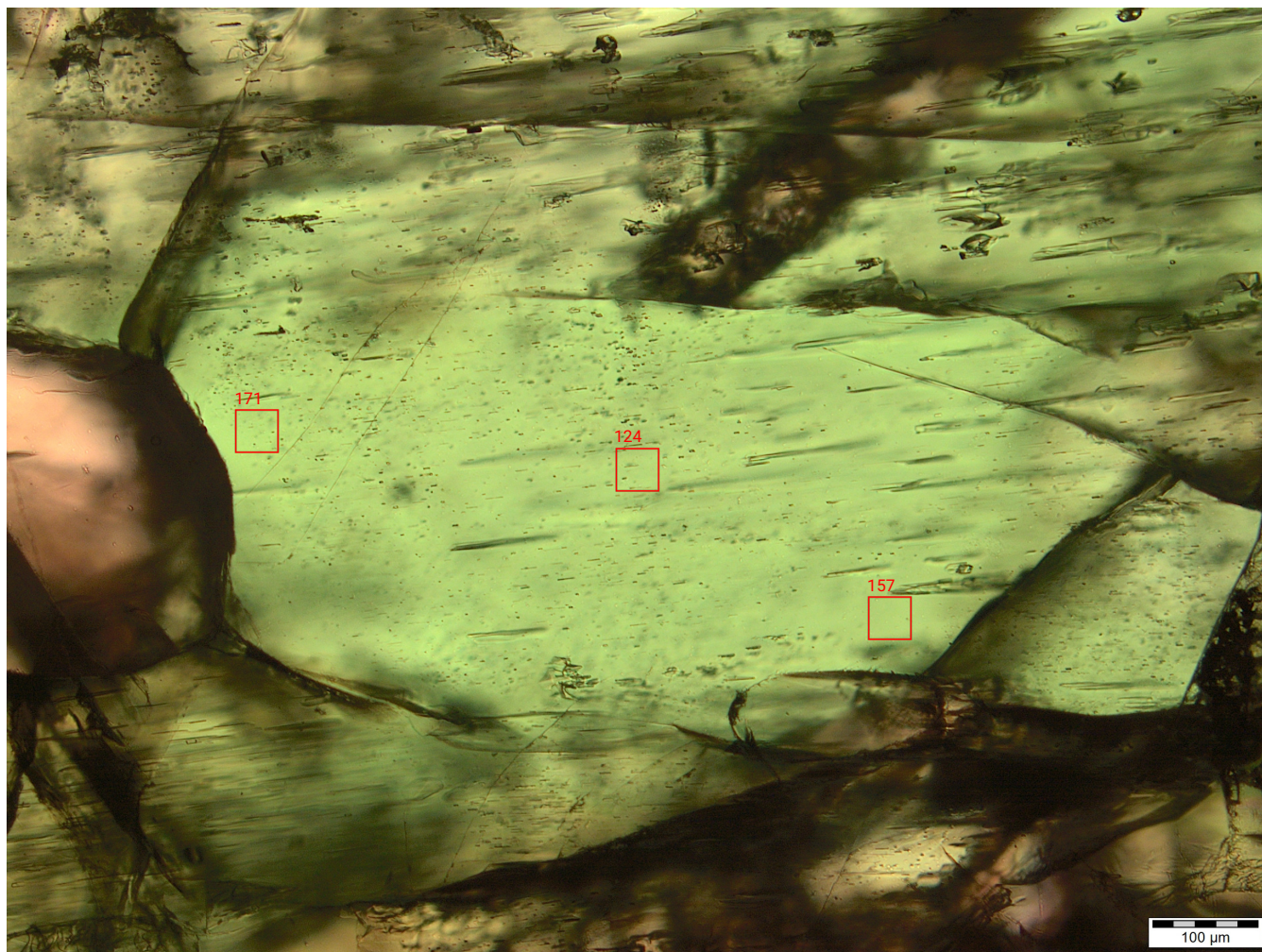


Figure S4. Photographic image (PPL) of a polished rock slab with a thickness of 467 μm from sample M65 showing a Cpx grain (centre) with sub-horizontally oriented inclusions of Qz and Prp and areas (squares) analysed by FTIR spectroscopy. The analysis of tiny inclusions could not always be avoided when analysing the host Cpx. The numbers refer to the amount of structural hydroxyl (in $\mu\text{g g}^{-1}$) quantified within the analytical areas using the calibration of Bell et al. (1995) and have an error propagated uncertainty (1σ) of 5.5 % (see Methods section).

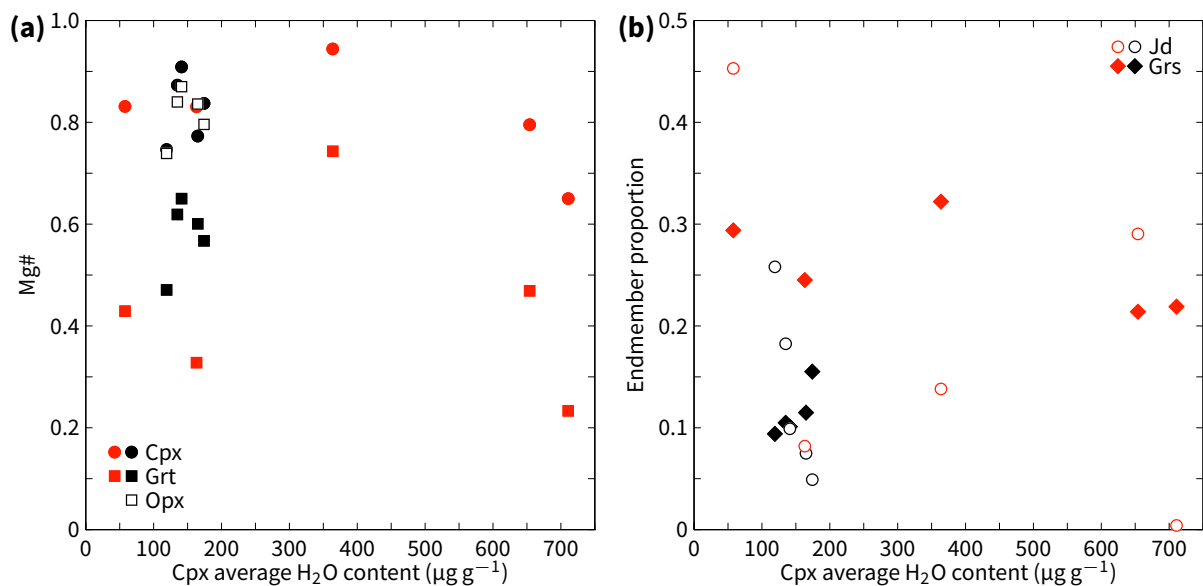


Figure S5. Bivariate plots of selected mineral chemistry shown in Table 1 (using the calibration of Bell et al. 1995) and Table S3 (central values were used for data ranges). (a) Mg# vs. average hydroxyl content in Cpx. (b) Endmember proportions vs. average hydroxyl content in Cpx. Symbols in red refer to Opx-free eclogite and others to Opx-bearing eclogite. While the Mg# and the Grs component have little or no effect on the structural hydroxyl content in Cpx, the Jd component shows a negative correlation for most data points.