



*Supplement of*

## **Earthquake swarms frozen in an exhumed hydrothermal system (Bolfín Fault Zone, Chile)**

**Simone Masoch et al.**

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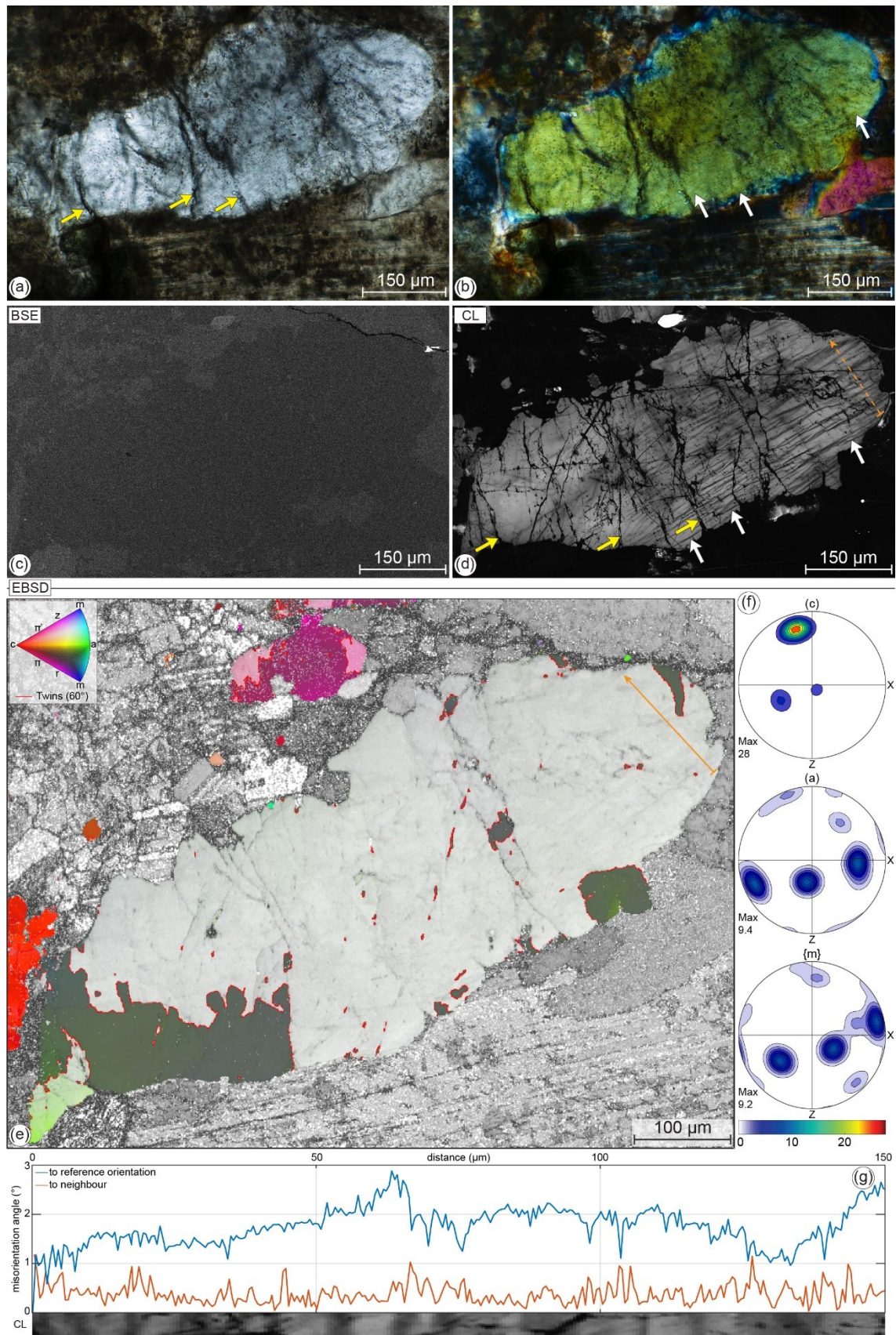


Figure S1. Quartz grain within the micro-damage zone of a sheared vein (sample 19-38). Distance from the vein boundary  $\sim 770 \mu\text{m}$ . White arrows = deformation lamellae, yellow arrows = healed veinlets; orange arrows = trace of

misorientation profile in (g). (a) Plane-polarized light micrograph. (b) Cross-polarized light micrograph. Note that the thin section thickness is 100  $\mu\text{m}$ . Thus, interference colors in the cross-polarized light image are not the regular ones observable in 30- $\mu\text{m}$ -thick thin sections. (c) and (d) BSE and corresponding CL images. (e) Inverse Pole Figure (IPF) map, color coded according to IPF legend (Y direction). The IPF map is overlaid to the orientation contrast image. (f) Contoured pole figures. (g) Misorientation profile with corresponding CL banding.

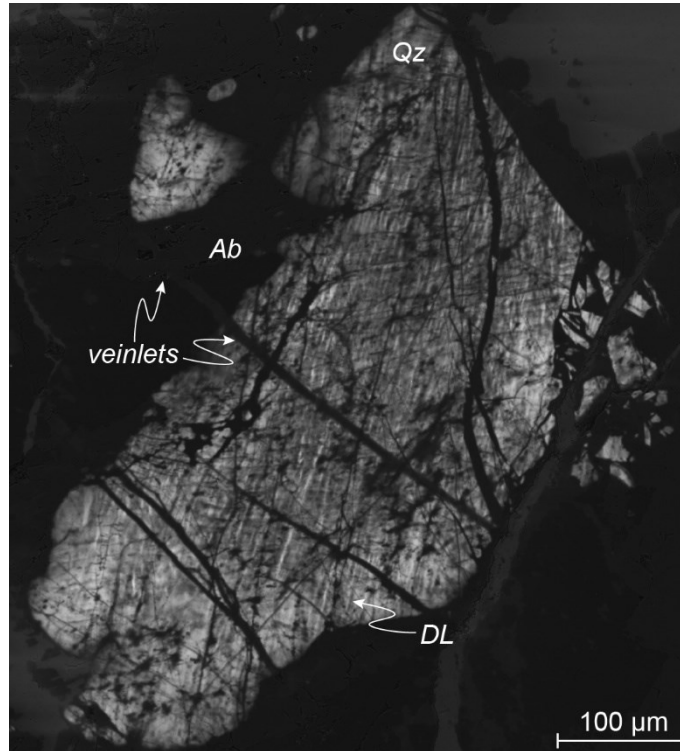


Figure S2. Corresponding CL image of the quartz grain shown in Fig. 3d. The deformed magmatic quartz (*Qz*) shows bright to medium, CL grey-shaded domains, which are pervasively cut by interlaced darker deformation lamellae (*DL*). The deformed quartz grains neighbor albite grains (*Ab*) are cut by CL-dark veinlets (*veinlets*). The veinlets correspond to the micro-fractures outlined by fluid inclusion trails (yellow arrows in Fig. 3d). Sample SQ04-18.

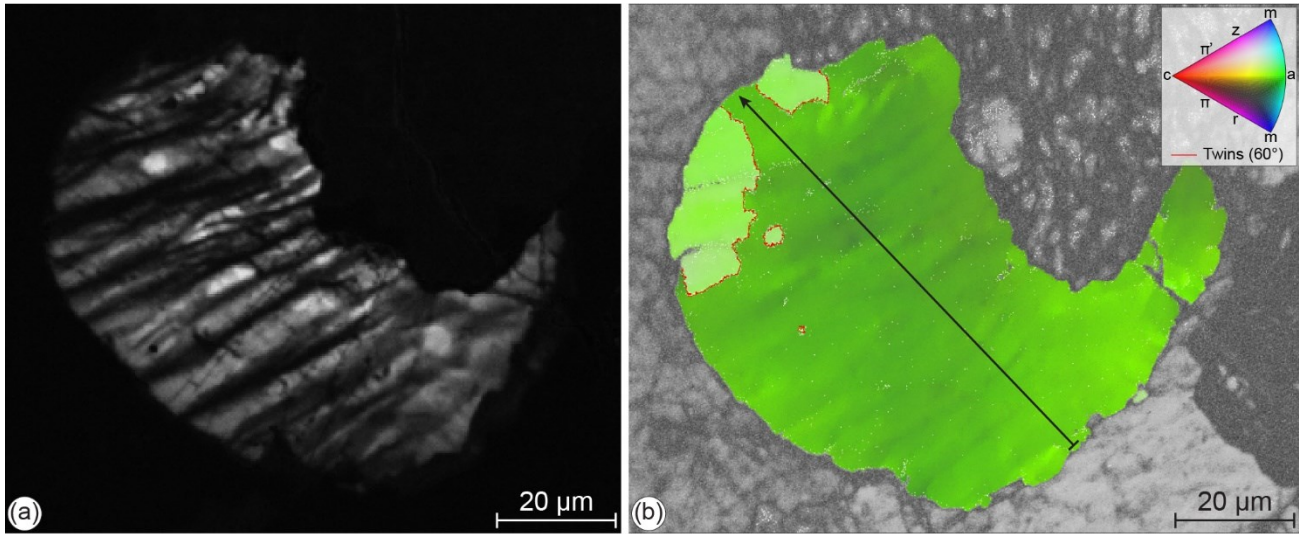


Figure S3. Quartz grain within the micro-damage zone of a sheared vein (sample 19-38). Distance from the vein boundary ~5 mm. (a) CL image. (b) Inverse Pole Figure (IPF) map, color coded according to IPF legend (Y direction). The IPF map is overlaid to the orientation contrast image. The black line marks the profile in (c). (c) Misorientation profile with corresponding CL banding.

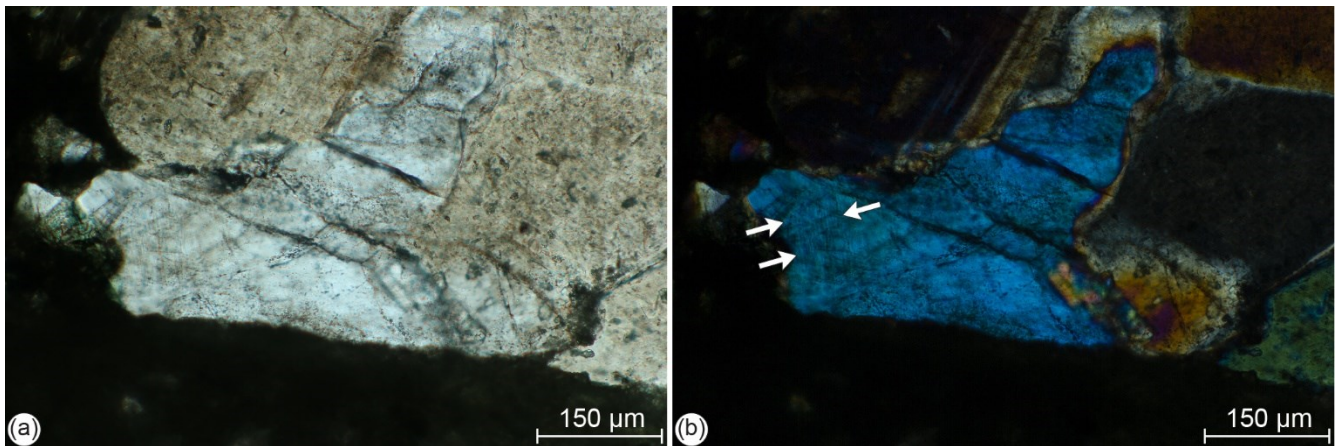


Figure S4. Corresponding OM images of the quartz grain shown in Fig. 6i-j. (a) Plane-polarized light. (b) Cross-polarized light. White arrows indicate the deformation lamellae. Note that the thin section thickness is 100 μm. Thus,

**interference colors in the cross-polarized light image are not the regular ones observable in 30- $\mu$ m-thick thin sections.  
Sample 19-38.**

**Table S1**

Mineral phase	Ep	Ep	Ep	Ep	Ep	Ep	Ep	Ep	Ep	Ep	Ep	Ep	Ep	Ep
BSE greyscale	dark	dark	dark	dark	dark	dark	dark	dark	dark	light	light	light	light	light
Component (%)														
Na <sub>2</sub> O												0.02	0.03	
MgO										0.20		0.16	0.09	0.16
Al <sub>2</sub> O <sub>3</sub>	26.24	26.18	25.12	25.21	24.56	24.94	25.03	25.53	25.04	22.88	24.42	24.94	25.04	23.84
SiO <sub>2</sub>	38.57	38.56	38.49	37.18	36.94	37.52	38.19	37.35	37.78	37.51	37.19	36.65	37.03	38.27
K <sub>2</sub> O		0.04	0.02							0.02	0.03	0.02		
CaO	23.09	23.61	23.12	23.08	23.05	23.90	23.93	23.50	23.78	22.05	23.51	23.07	23.04	22.89
TiO	0.11	0.15	0.07		0.04					0.02	0.21	0.09	0.07	0.06
Cr <sub>2</sub> O												0.01	0.05	
MnO			0.17	0.16	0.20					0.06	0.09	0.08	0.12	0.16
FeO	9.98	9.24	10.99	10.31	10.47	10.63	9.80	10.12	10.17	13.93	11.41	11.22	11.55	10.72
Total	97.99	97.77	97.98	95.94	95.27	96.99	96.95	96.50	96.77	96.66	96.86	96.26	97.02	96.10
Mineral phase	Ep	Ep	Ep	Ep	Ep	Prn	Prn	Prn	Prn	Prn	Prn	Prn	Prn	Prn
BSE greyscale	light	light	light	light	light	light	light	light	light	light	light	light	light	light
Component (%)														
Na <sub>2</sub> O														
MgO									0.06					
Al <sub>2</sub> O <sub>3</sub>	23.68	24.42	24.40	23.36	23.15	21.21	22.26	21.79	21.87	22.08	22.20	22.92	22.71	22.27
SiO <sub>2</sub>	37.98	38.21	37.90	37.23	38.31	42.97	43.84	42.77	43.04	43.26	42.62	43.03	43.93	44.70
K <sub>2</sub> O			0.03			0.02	0.02		0.03			0.03	0.01	
CaO	23.35	23.15	23.03	23.07	23.66	26.66	26.63	26.76	26.35	26.71	26.62	26.61	27.18	27.04
TiO	0.10	0.04			0.10	0.17	0.21	0.11	0.05	0.07	0.13	0.21	0.09	
Cr <sub>2</sub> O		0.03		0.15				0.00				0.18		
MnO			0.11	0.29	0.37			0.12						0.11
FeO	11.91	12.96	11.99	13.03	11.99	3.76	3.31	3.42	4.20	3.12	2.54	2.63	2.95	3.24
Total	97.02	98.81	97.47	97.13	97.57	94.79	96.27	94.97	95.60	95.24	94.11	95.63	96.87	97.36
Mineral phase	Prn	Prn	Prn	Prn	Prn	Prn	Prn	Prn	Prn	Prn	Prn	Prn	Prn	Prn
BSE greyscale	light	light	light	light	light	light	dark	dark	dark	dark	dark	dark	dark	dark
Component (%)														
Na <sub>2</sub> O														
MgO								0.10		0.37				
Al <sub>2</sub> O <sub>3</sub>	21.67	22.33	22.77	23.41	21.30	21.86	23.12	23.54	23.78	23.77	24.01			
SiO <sub>2</sub>	43.99	43.94	43.34	43.22	42.44	43.31	42.77	43.55	43.13	43.62	43.98			
K <sub>2</sub> O							0.04							
CaO	27.04	27.12	27.12	26.94	26.52	27.03	26.53	27.42	27.51	26.88	27.48			
TiO	0.06	0.04					0.15							
Cr <sub>2</sub> O														
MnO									0.17	0.16	0.13			
FeO	3.85	3.40	2.57	2.24	3.47	3.70	1.86	1.11	0.88	1.78	1.17			
Total	96.61	96.83	95.80	95.82	93.74	95.90	94.57	95.62	95.46	96.57	96.76			

**Table S1. Epidote and prehnite compositions from WDS-FEG. Dark and light refer to different grey color in BSE images.**