

GEOTHERMAL
**THE NEXT
GENERATION**

Experimental Studies of Supercritical Fluid-Rock Interactions

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Experimental Geochemistry Laboratory

Founded in 2010

The lab specializes in
Water-rock interaction geochemistry
in hydrothermal systems

Focusing on experimental work
at high temperatures and pressures
for scientific and commercial
purposes





Experimental Geochemistry Laboratory - Team



Dr Bruce Mountain
Senior Hydrothermal Geochemist



Dr Peter Rendel
Hydrothermal Geochemist

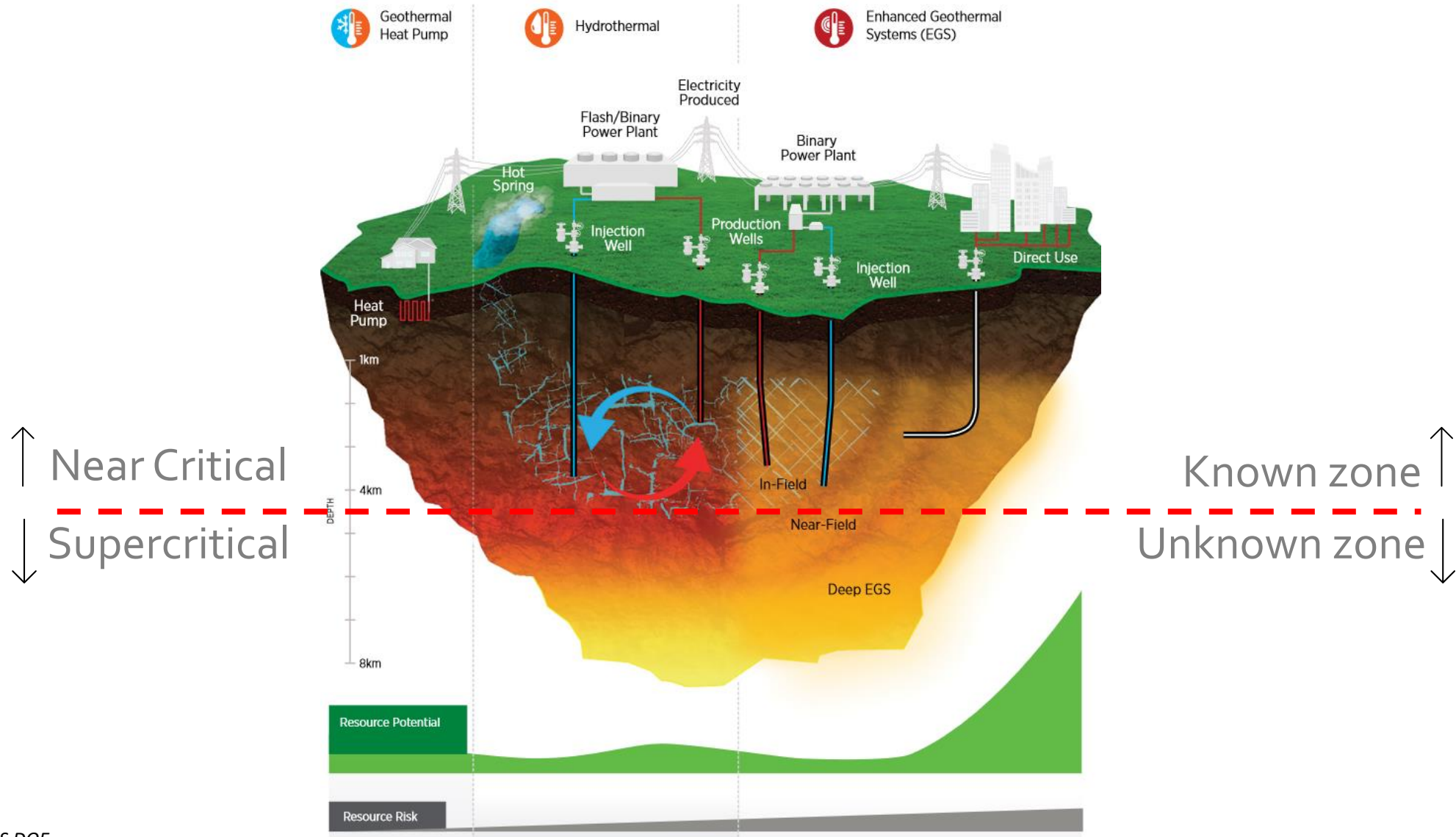


Dr Lucjan Sajkowski
Hydrothermal Geochemist



Dr Isabelle Chambeft
Senior Hydrothermal Geochemist

What is Supercritical Geothermal?



Temperature °C

Nominal well
depth km

Ground Surface

50

100

150

200

250

300

350

400

450

500

Pressure
MPa

0

10

20

30

40

50

60

1

2

3

4

5

6

Boiling Curve

Superheated Vapour

Critical Point for pure water
~ 374 °C and 22 MPa

Liquid

Supercritical
Zone



GEO THERMAL
THE NEXT
GENERATION



Experimental
Geochemistry
Laboratory

Supercritical

- Unique supercritical flow-through reactor
- Pressures up to 290 bar.
- Temperature up to 700°C

Experiments

- Supercritical water- rock interaction
- Mineral solubility experiments
- Tracer stability tests



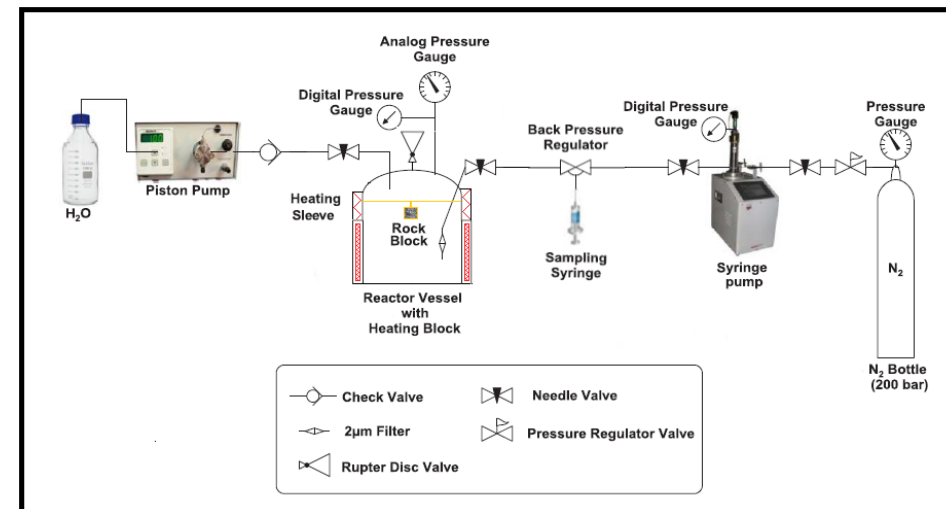
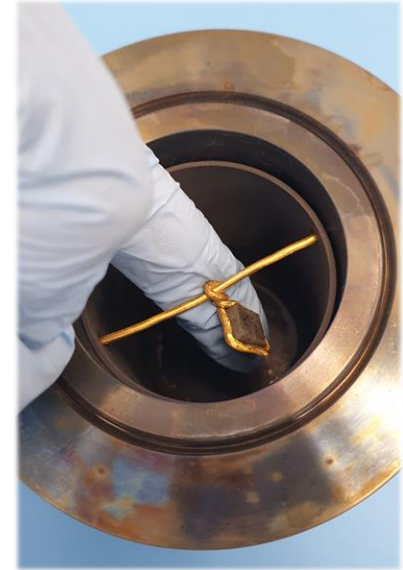
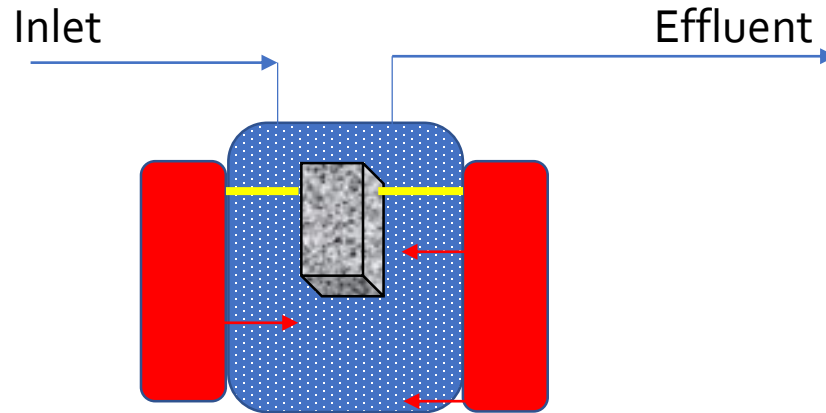
EXPERIMENTAL RESULTS

Fluid: Distilled water
Rock: NZ "unaltered" Greywacke

Temperature
500°C

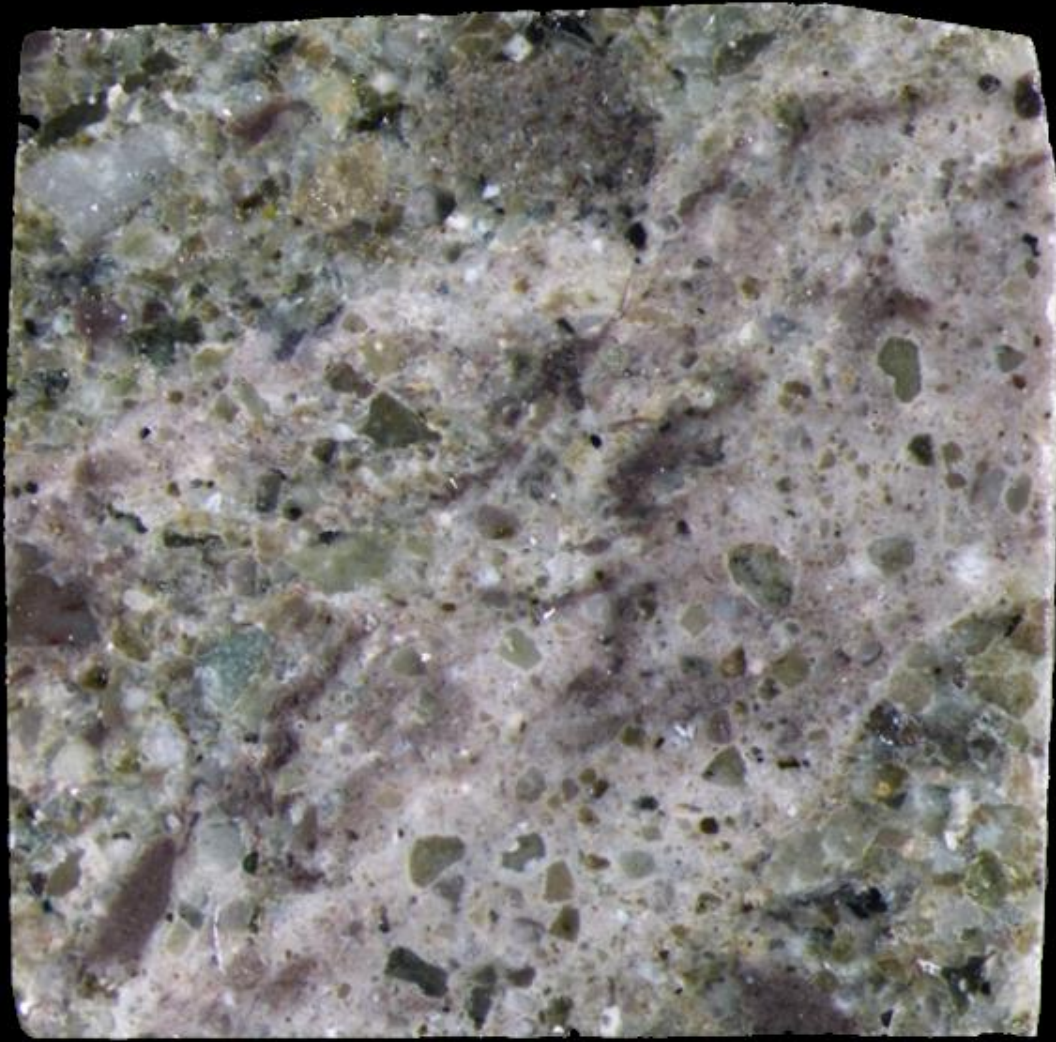
Pressure
210 bar

Fluid density
0.072 g cm³

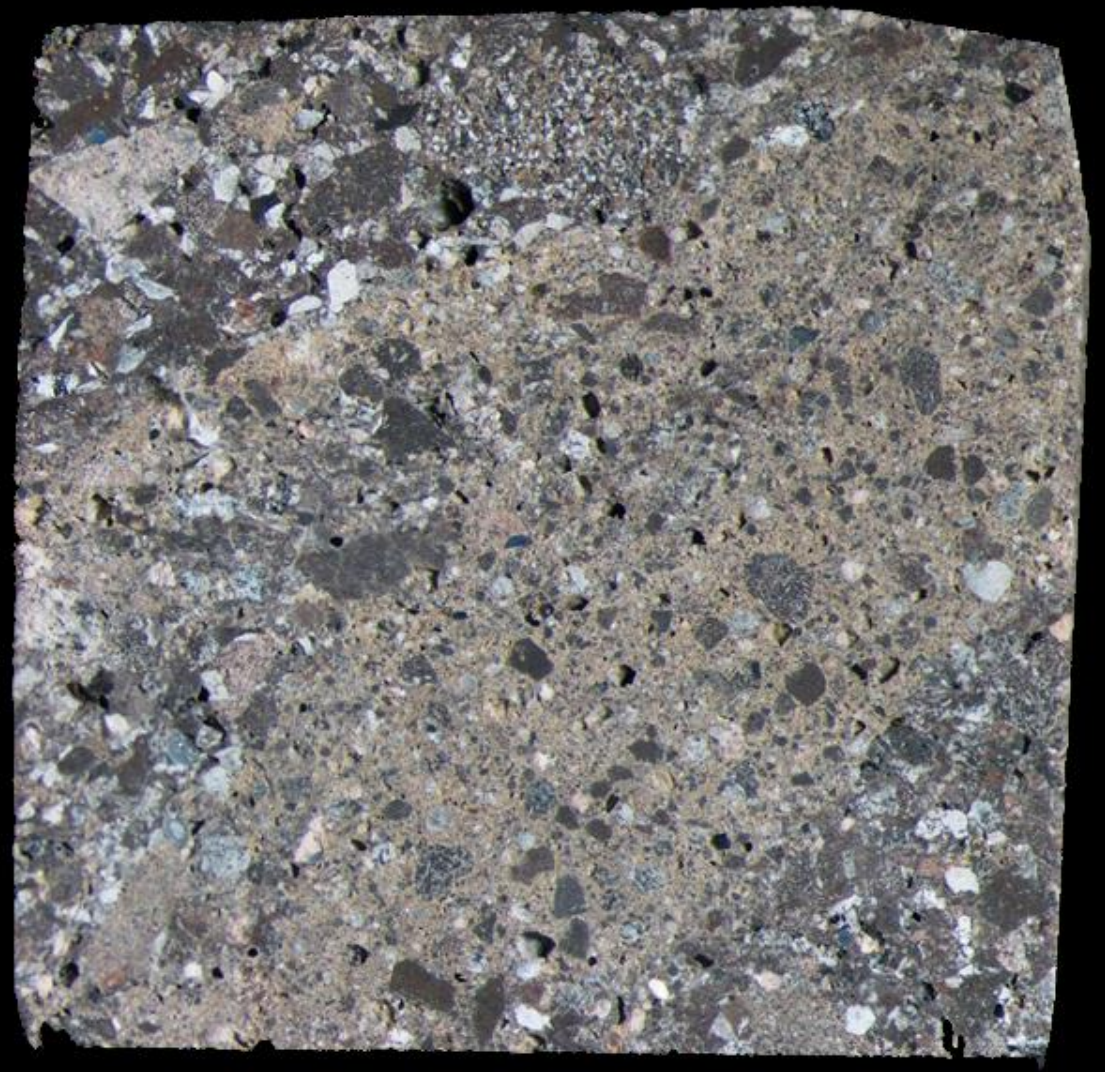


LIGHT MICROSCOPY

Unreacted

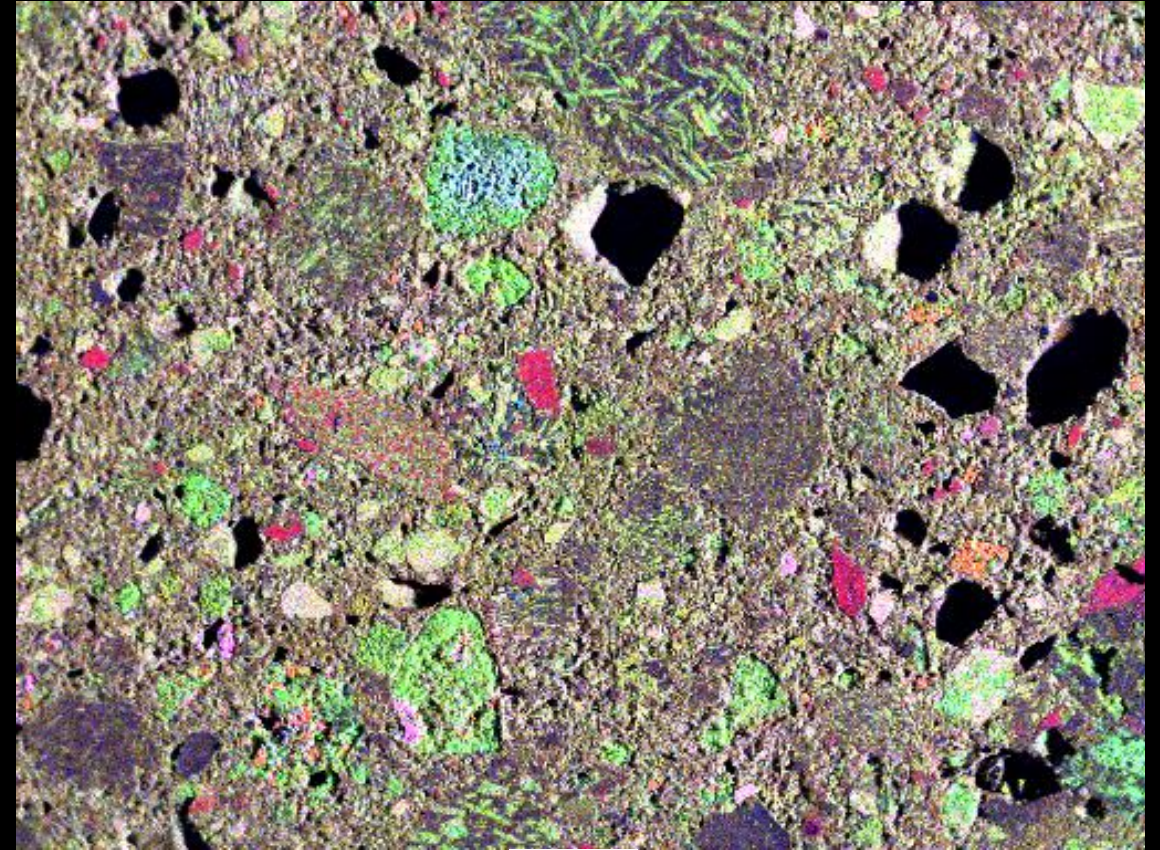
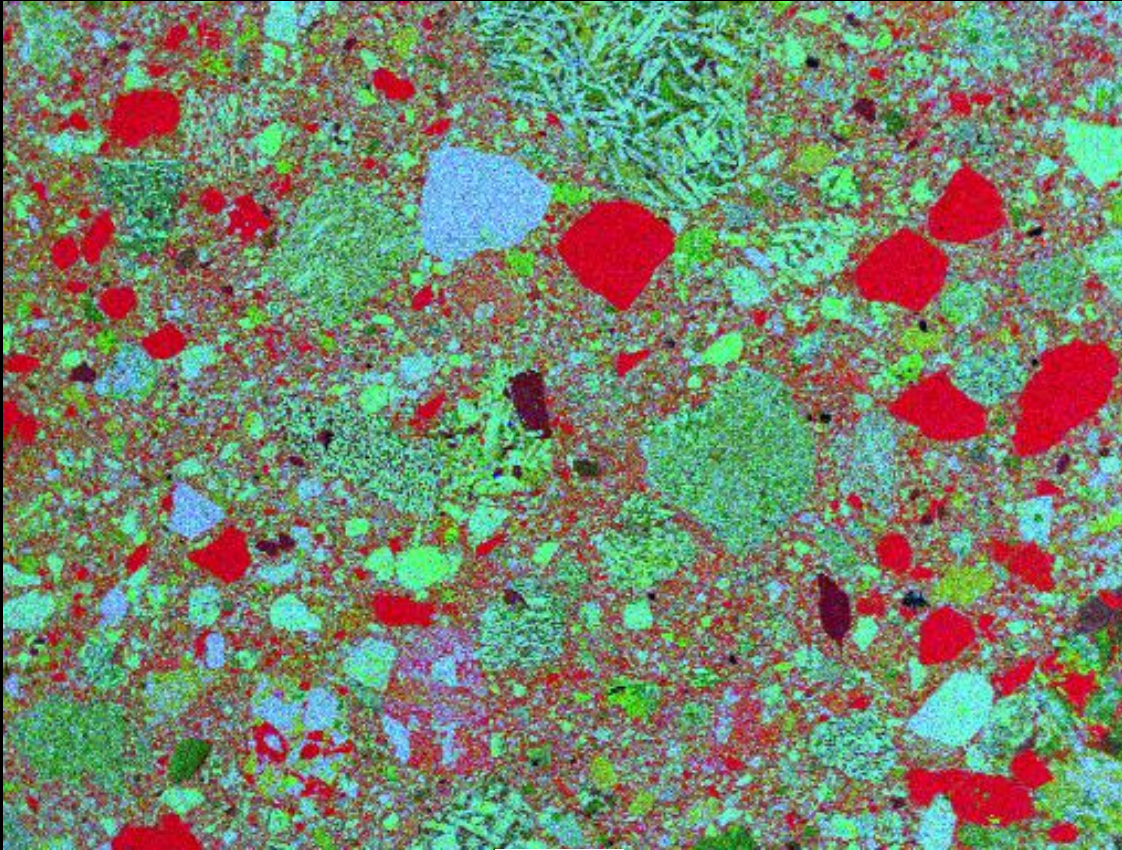


Reacted



8mm

SEM - EDS MAPS



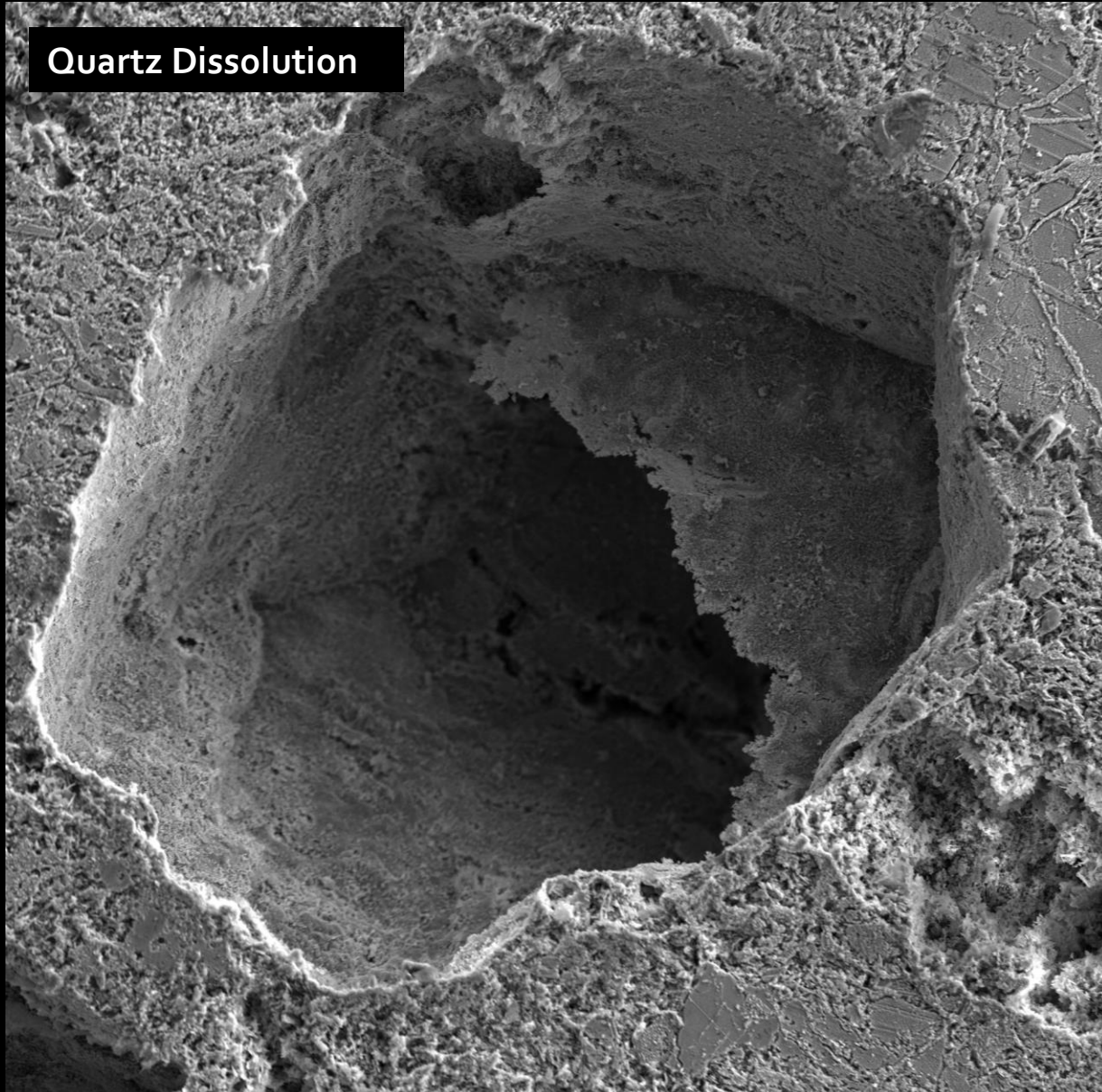
Albite -> Andesine

Pyroxenes -> Clinopyroxenes/
Hornblende/clays

Si Al Na

SEM IMAGES

Quartz Dissolution

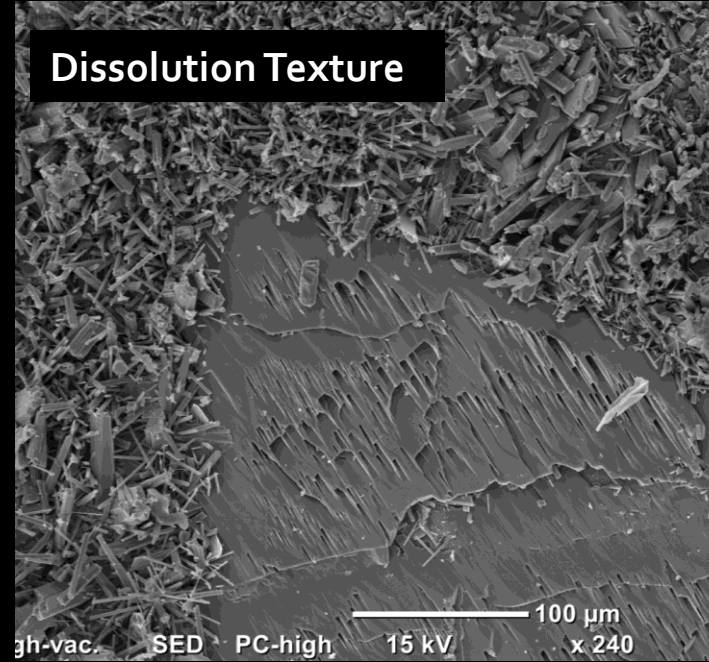


X 170

15.0kV SEI

100µm Auckland 23
NOR WD 11.3mm

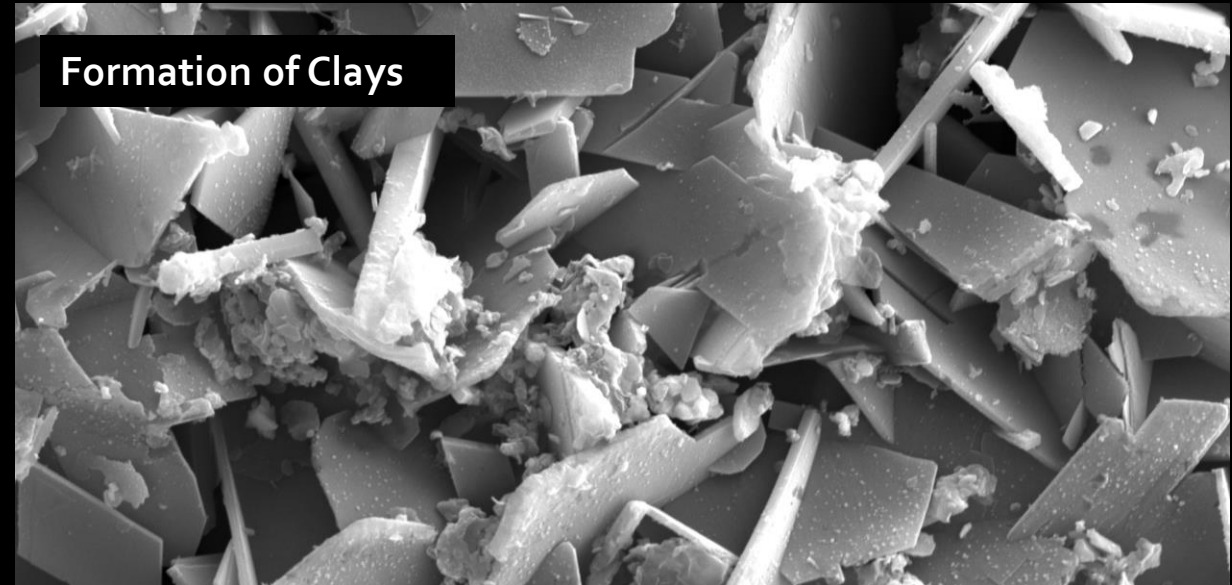
Dissolution Texture



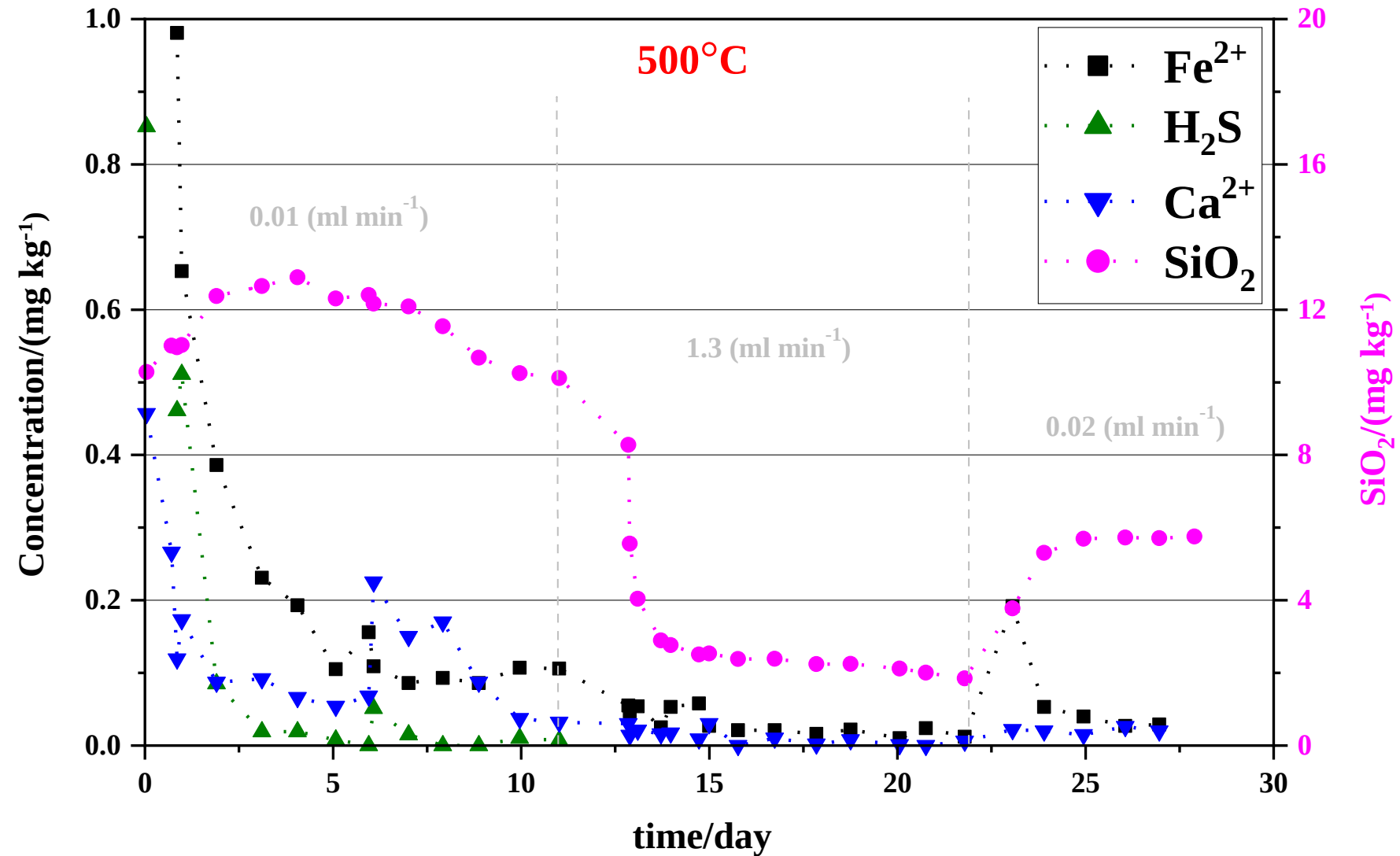
Precipitation Texture



Formation of Clays

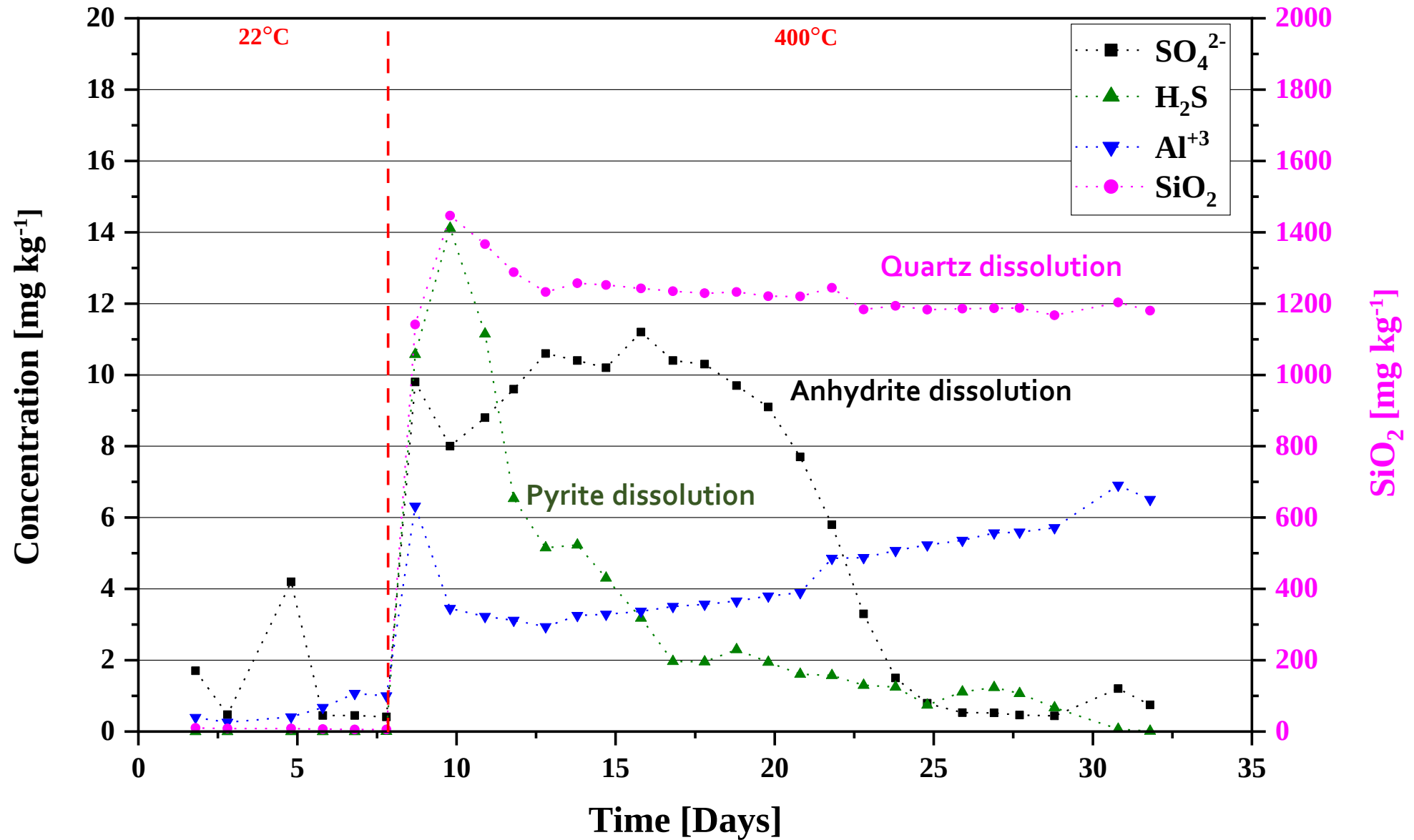


EFFLUENT CHEMISTRY



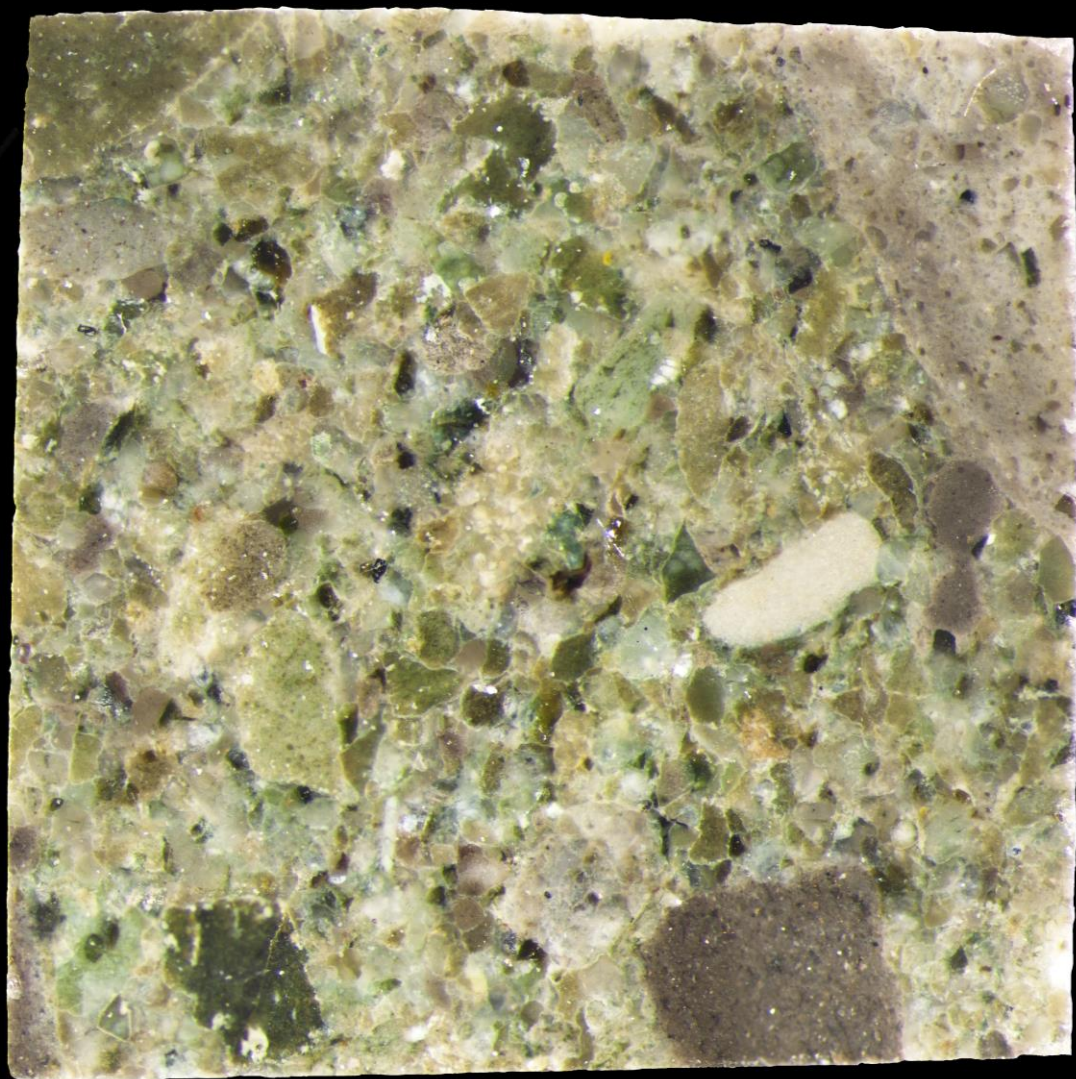
Fast Kinetics - Lower solubilities

EFFLUENT CHEMISTRY

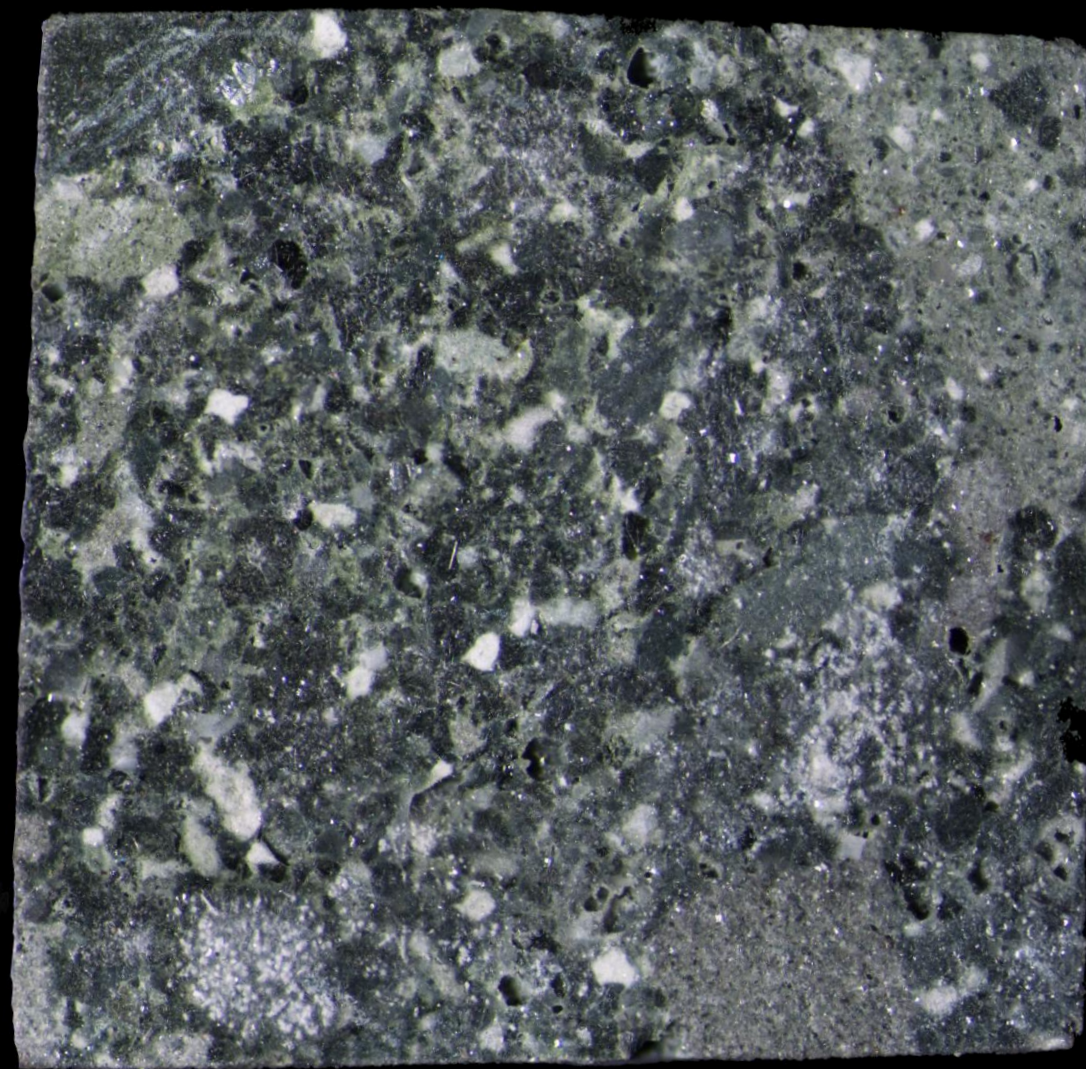


Geothermal Brine at 400C, 250 bar

Before



After





G N G P A R T N E R S

KIA ORA



**MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT**
HĪKINA WHAKATUTUKI



BRIDGER
CONSULTING

www.geothermalnextgeneration.com

