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3 Morphological and chemical characterization of secondary carbonates in the Toki granite,
4 central Japan, and the evolution of fluid chemistry.

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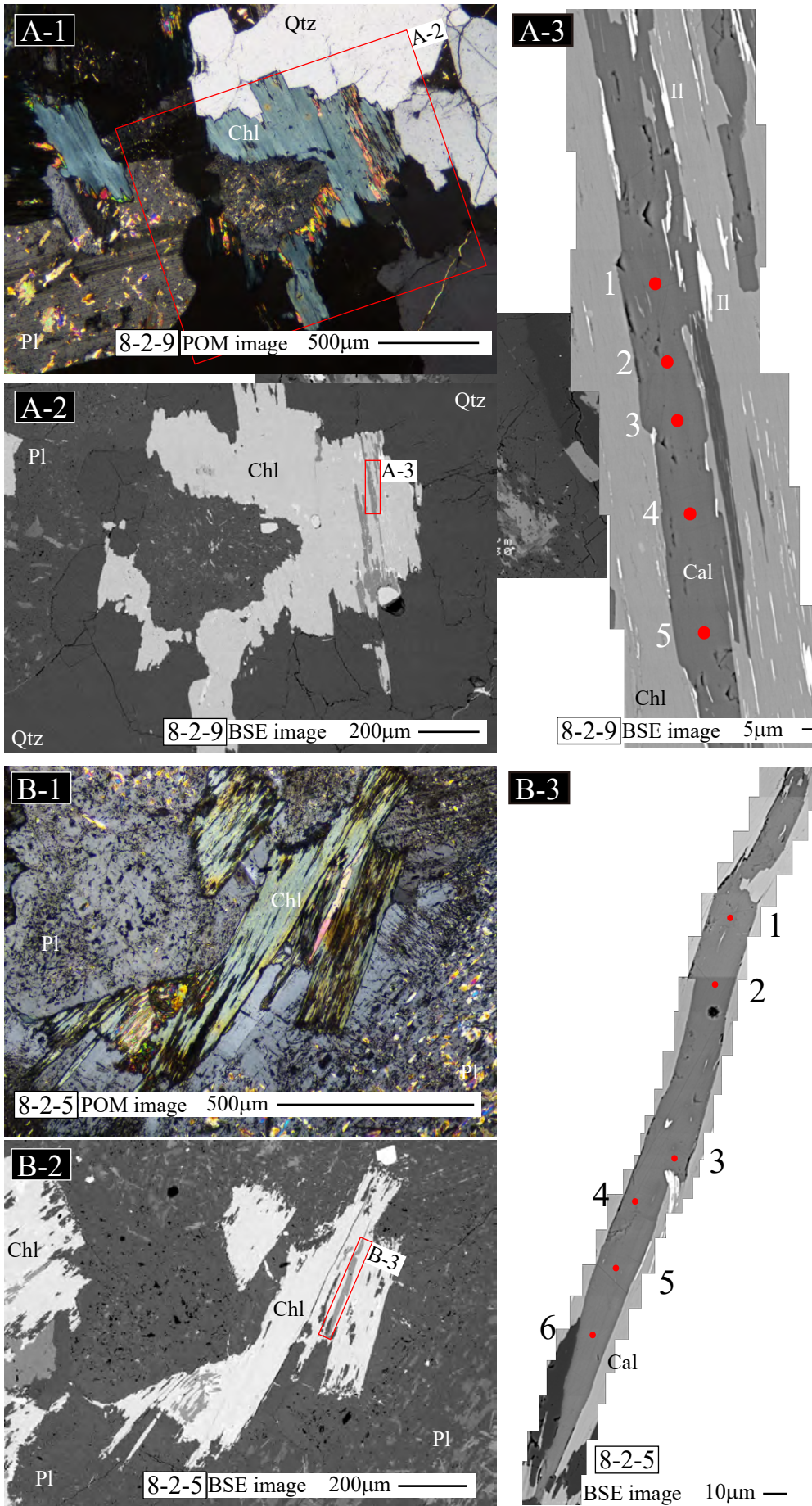
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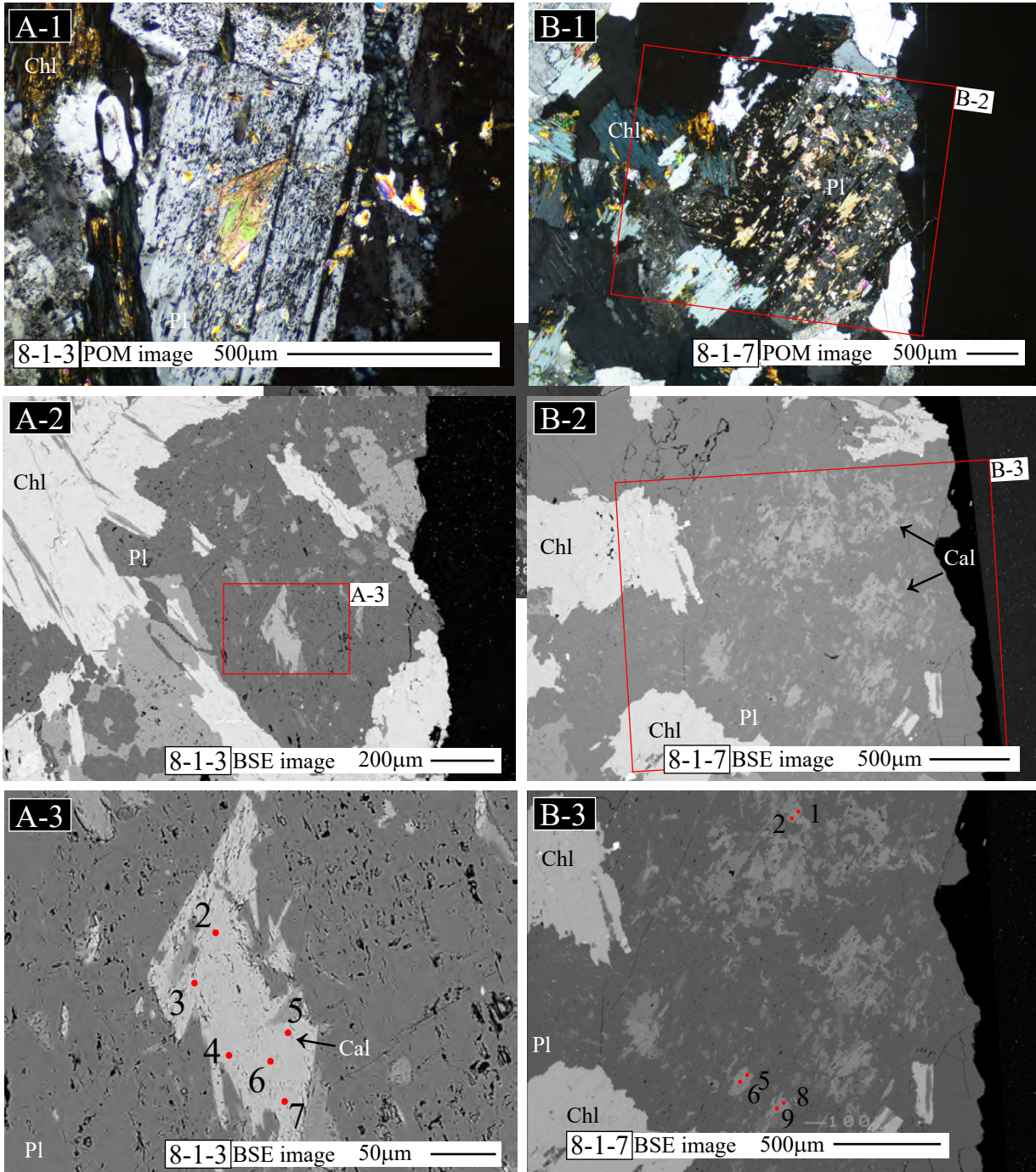
ABSTRACT

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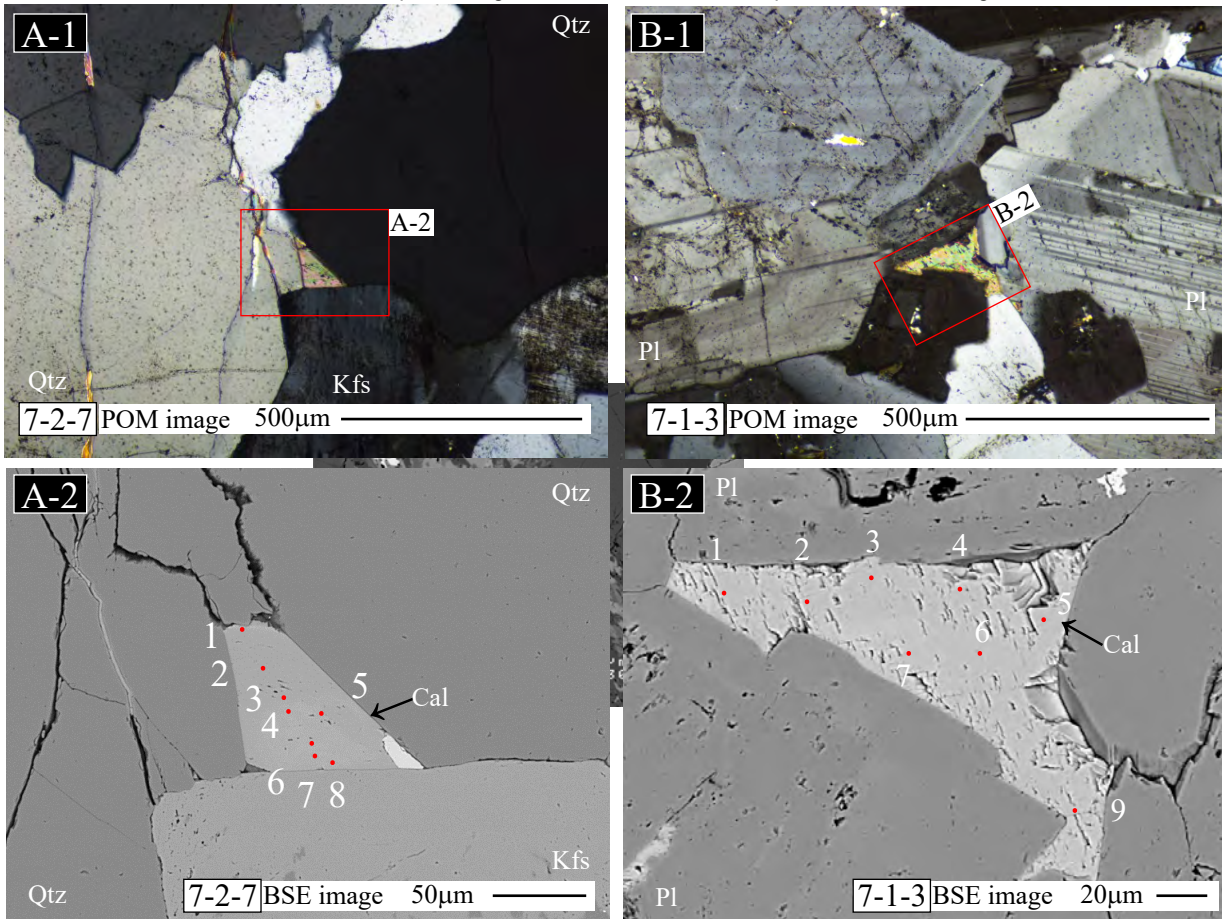
15 This study describes the 1) morphological nature of the calcites in the Toki granite, central
16 Japan, 2) difference in chemical compositions in terms of morphological classification, and
17 3) identification of the stages of calcite formation and the corresponding mass transfer
18 between minerals and fluid owing to hydrothermal alterations and groundwater–rock
19 interactions, which reveals the sequential variations in fluid chemistry during the
20 sub-solidus stage. Calcites in the Toki granite were classified into four types as follows: 1)
21 lenticular calcite in the chloritized biotite, 2) granular calcite in the altered plagioclase, 3)
22 intergranular calcite, and 4) fracture-filling calcite. The lenticular, granular, and
23 intergranular calcites contain greater amounts of iron, manganese, and magnesium than
24 fracture-filling calcites. The lenticular calcite in the chloritized biotite, granular calcite in
25 the altered plagioclase, and intergranular calcite formed due to the precipitation of calcium,
26 iron, manganese, and magnesium released from biotite and plagioclase owing to
27 hydrothermal alterations. The fracture-filling calcites formed at a later stage than the
28 lenticular, granular, and intergranular forms. In the hydrothermal fluid, the concentrations
of aluminum, iron, manganese, and the

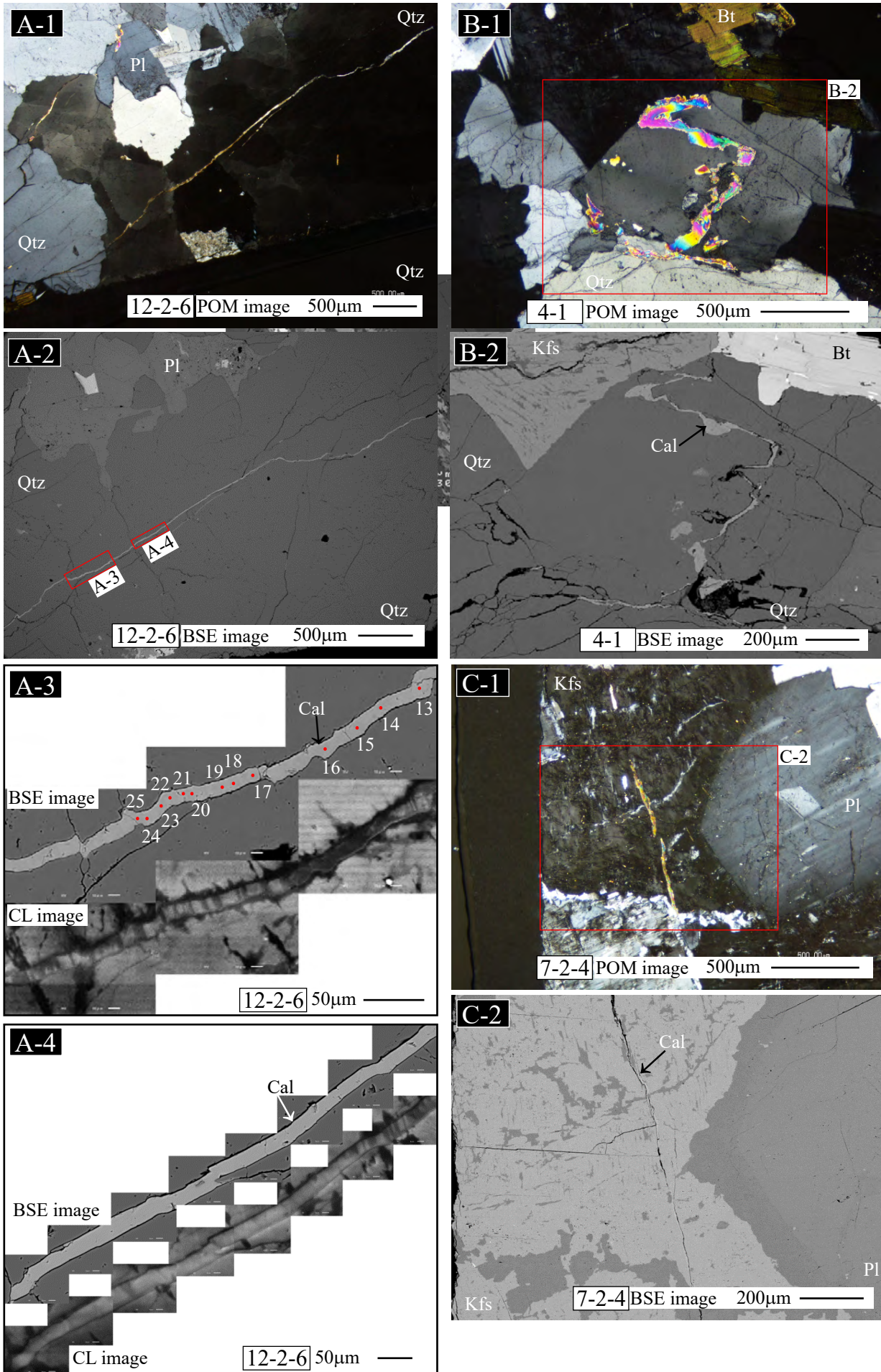


Yuguchi et al. Fig. 2

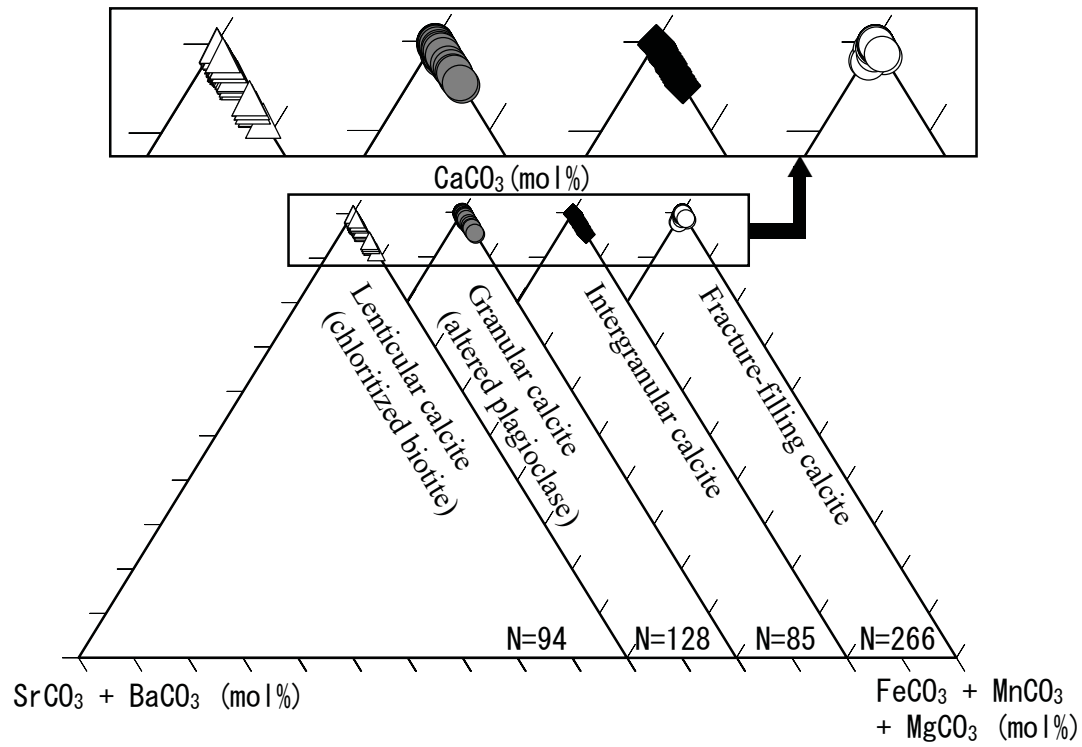


Yuguchi et al. Fig. 3

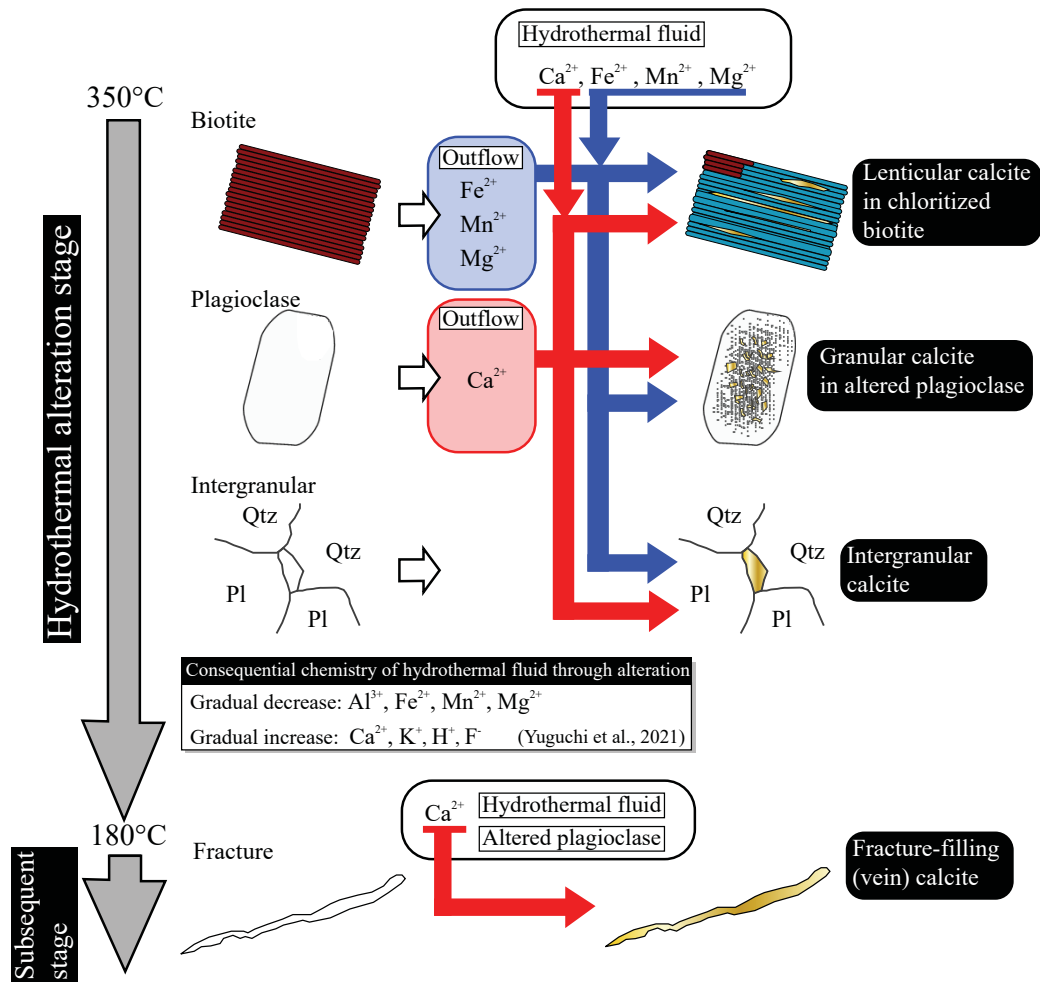




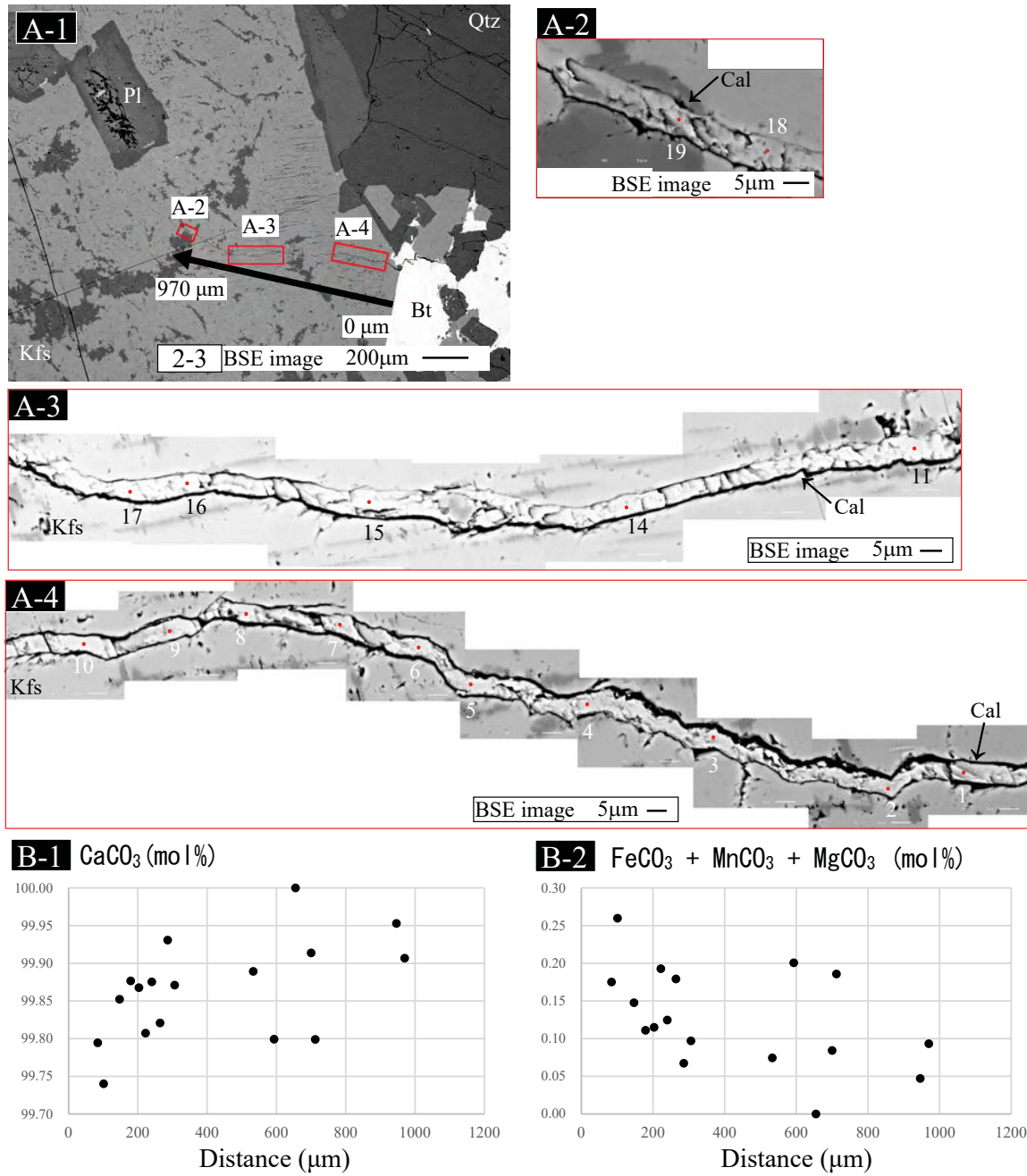
Yuguchi et al. Fig. 5



Yuguchi et al. Fig. 6



Yuguchi et al. Fig. 7



Yuguchi et al. Fig. 8