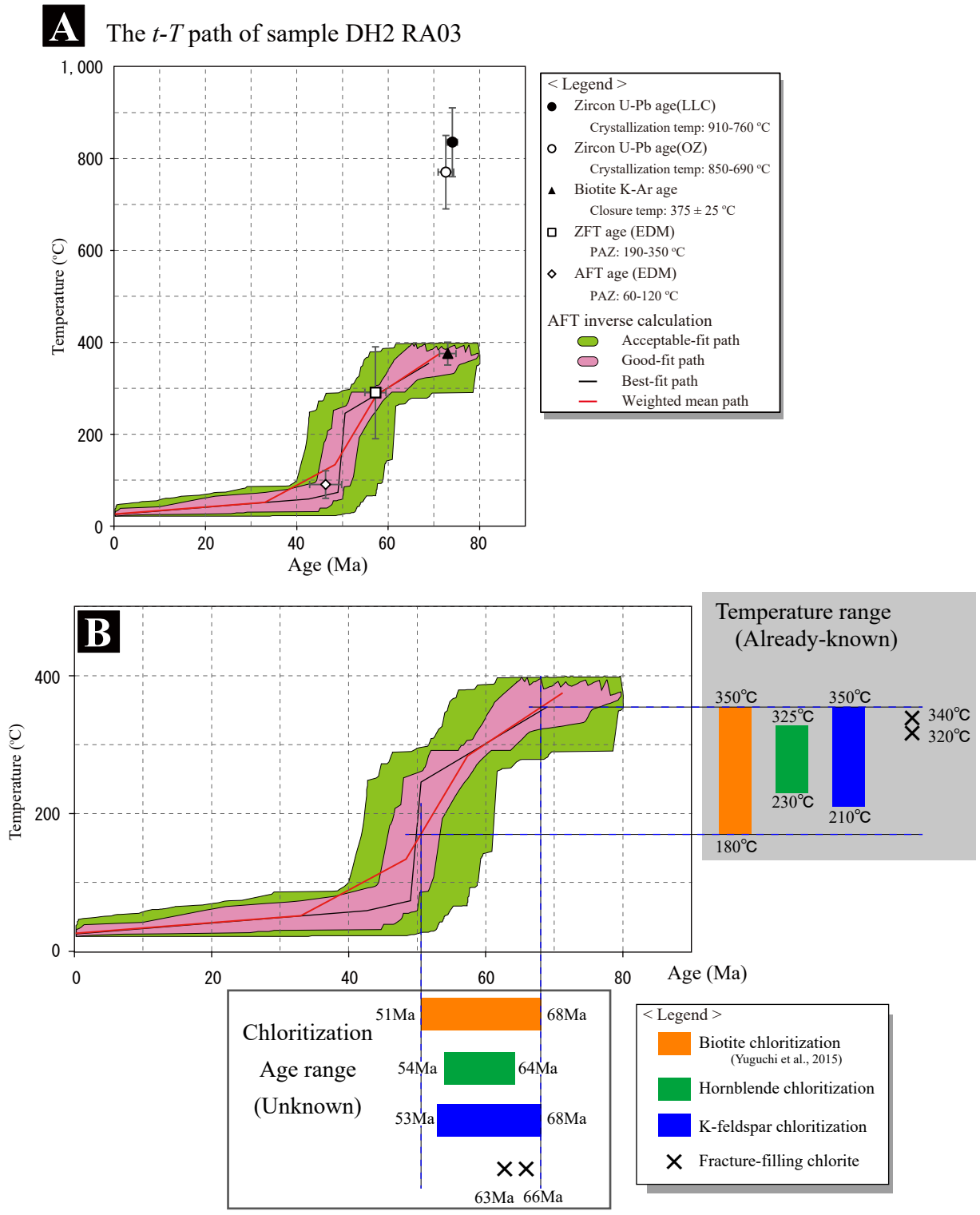

Supplemental Figure S7. The t-T path determining both the temporal and thermal conditions of the secondary minerals. (A) The t-T path of sample DH2 RA03 is constructed from thermochronological data including zircon U-Pb ages, biotite K-Ar age, ZFT age, AFT age, and the FT inverse calculation. The FT inverse calculation was derived from a dataset, including the AFT age, AFT lengths, ZFT age, and ZFT lengths, and provided the acceptable-fit paths, good-fit paths, best-fit path, and the weighted mean path below 400{degree sign}C. The details of the FT inverse calculation are described Yuguchi et al. (2019B). The envelope of good-fit paths include the biotite K-Ar, ZFT, and AFT ages, resulting in a reasonable reproduction of the t-T path from the biotite K-Ar closure temperature (350-400 °C) through the ZFT partial annealing zone (PAZ) (190-390 °C) to the AFT PAZ (60-120 °C). (B) The temporal condition for overall chloritization, whose thermal condition is already known (Yuguchi et al., 2015 and this study), is obtained through the weighted mean t-T path. In biotite chloritization, the intersection of the weighted mean t-T path and the thermal condition of 350 °C (blue horizontal line) gives a formation age of about 68 Ma, and that of the t-T path and a thermal condition of 180 °C gives an age of about 51 Ma. This indicates that the biotite chloritization occurred over about 17 million years, from about 68-51 Ma. The hornblende chloritization occurred at temperature conditions in the range of 230-325 °C and over about 10 million years from about 64-54 Ma. The K-feldspar chloritization occurred at temperatures in the range of 210-350 °C and over about 15 million years of about 68 to 53 Ma. The formation conditions of fracture-filling chlorite are 320 °C and 340 °C (thermal condition) and about 63 Ma and 66 Ma in age, respectively.

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