Goldschmidt 2022 Abstract
https://doi.org/10.46427/gold2022.12777

The timing of skarn formation of the Kamaishi deposit in the Kitakami Mountains, Japan by zircon and garnet U-Pb datings and the chemical characteristics of igneous complexes around the deposit.

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The Kamaishi deposit in the Kitakami Mountains, Northeastern Japan is a largest Fe-Cu deposit in Japan. Early Cretaceous igneous complexes, the Ganidake granodiorite and diorite, and the Kurihashi granodiorite are occurred around the Kamaishi deposit. The Ganidake granodiorite is considered to have formed Fe-Cu mineralization and zonal skarn of the Kamaishi deposit, although there is no significant age difference between the Ganidake and Kurihashi granodiorites. The zonal skarn was formed at the boundaries between limestones and sedimentary rocks or the granodiorites. In this study, U-Pb dating of garnets from skarn and U-Pb dating of zircons from igneous complexes around the mine have applied to understand the timing of skarn mineralization, and other geological events. We also examine zircon Hf isotopic compositions, and whole-rock geochemical and Sr-Nd isotopic compositions of the granodiorites around the deposit. On the basis of previous studies, the ages of granitic rocks in Kitakami Mountains range from 127 to 113 Ma and are generally young in the western part of the mountains. The zircon U-Pb dating of the Ganidake granodiorite and the Kurihashi granodiorite yield 123.43 ± 0.70 Ma and 119.65 ± 0.71 Ma respectively. Our preliminary result of the U-Pb garnet dating show 129.5 ± 5.8 Ma which consistent to the U-Pb zircon age of the Ganidake granodiorite. The isotopic and geochemical evidences of granitic complexes shows that the island arc-type magma led the skarn formation with significant amount of fluid.