

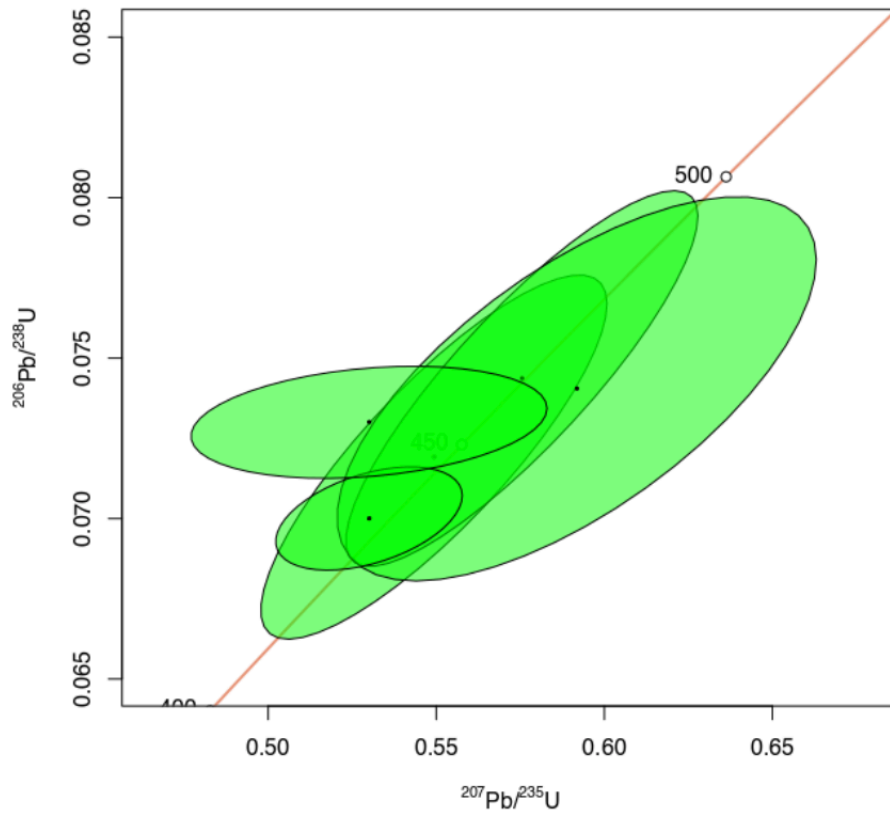
Early Paleozoic subduction-zone metamorphism in Japan: A geochronological reappraisal of Kitomyo Schists

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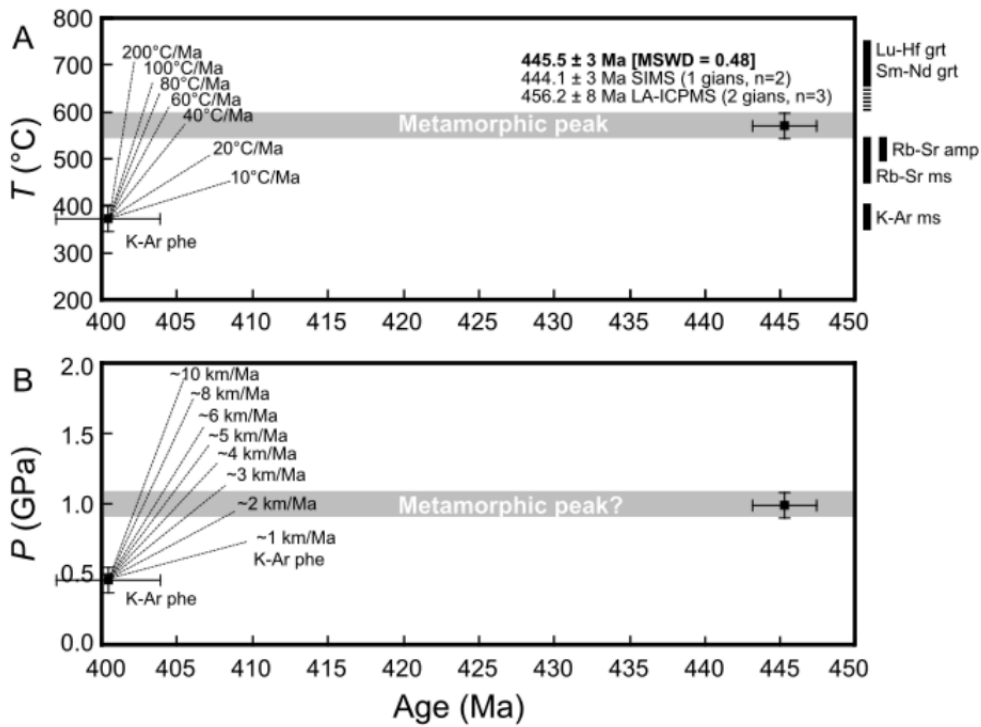
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Early Paleozoic subduction-related high-pressure metamorphic rocks have been reported from the Kitomyo Schists of the Kurosegawa Belt (Maruyama and Ueda 1975 [doi: 10.2465/ganko1941.70.47]) and the Fuko Pass Metacumulates (FPMC) of the Oeyama Belt (Tsujimori and Liou 2004 [doi: 10.1111/j.1525-1314.2004.00515.x]). In order better to understand the earliest subduction zone record of the 'proto-Japan', we revisited the Kitomyo Schists petrologically and geochronologically. The metasedimentary sample is a well-deformed, quartzo-feldspathic mica schist, with the mineral assemblage of garnet + clinozoisite + phengite (Si p.f.u. = 3.3–3.5) + quartz + albite. Euhedral grains show distinct prograde chemical zoning in spessartine decrease toward the rims. The lack of biotite, oligoclase and paragonite indicate that the schist underwent a HP intermediate type metamorphism. The metabasaltic rock is a well-deformed, amphibolite. Although the amphibolite was overprinted severely at a greenschist-facies condition, relict barroisitic amphibole [B]Na (Na in the B-site) = ~0.69 and rutile, indicating HP metamorphism. LA-ICPQMS and HR-SIMS zircon geochronology yielded 445.5 ± 3 Ma for the timing of HP intermediate type metamorphism of the Kitomyo Schists. Metamorphic zircon in metasedimentary sample is characterized by lower U (117–132 $\mu\text{g/g}$) and lower Th (34–143 $\mu\text{g/g}$) than detrital magmatic zircons. Our reappraisal suggests that the Kitomyo Schists formed in an Early Paleozoic subduction zone with geothermal gradient in the order of $\sim 15^\circ\text{C/km}$. Such a relatively high geothermal gradient in the subduction zone has produced the HP intermediate type metamorphism. The earliest subduction record in the 'proto-Japan' was not 'cool' enough to produce blueschist.

Keywords: metamorphic zircon, zircon geochronology



LA-ICPQMS and HR-SIMS U-Pb analysis of metamorphic zircons. Data are plotted on Concordia diagram



P-T condition of metamorphism

