[JJ] Evening Poster | B (Biogeosciences) | B-CG Complex & General

[B-CG09]Decoding the history of Earth: From Hadean to the present

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The latest results of Earth's evolution and geological processes through 4.6 billion years from Hadean to Modern, based on various approaches including fieldworks, chemical analyses, experiments and computer simulation, will be presented. In this session, we aim to discuss and understand causal relationships and interplay among the evolution of Earth's deep interior, changes in the surface environments, and development and evolution of life. Wide-ranging topics are accepted.

[BCG09-P04]The evaluation for the age bias with the grain size of detrital zircons from the Jack Hills

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Terrestrial rocks recording the age during Hadean era are rarely preserved because of surface erosion, subduction, and intensive meteorite bombardment. The only clue to reveal the early earth environment is detrital zircon in metamorphosed sediments at the Mt Narryer and the Jack Hills in the Narryer Gneiss Terrane, the Yilgarn Craton, Western Australia [1], where grains as old as ~4,404Myr have been found so far [2]. It is known that Hadean zircons from Jack Hills area include a variety of minerals mainly such as quartz, K-feldspar, plagioclase, aluminosilicate, muscovite, biotite, hornblende, apatite, monazite, xenotime, Fe-Ti oxide, rutile, and biogenic carbon [3]. Our group especially focus on the chemical features of apatite. It is possible to indicate some information from the mineral such as the source magma reflected by the compositions of whole rocks [4] and the hydrogen isotope composition measured from the hydroxy group in apatite [5]. However, the frequency of the old zircons over 4.0 Ga is no more than 5% in all from the Jack Hills [6]. Moreover, the zircons including isolated apatite from clacks exist as rare as about 8% in the >4.0Ga zircons [3]. 5μm is necessary as the minimum to make an accurate analysis using secondary ion mass spectrometry (SIMS), so it is likely to find the inclusions in coarse grains. Hence, we evaluated the bias toward zircon ages of the samples concentrated from a metaconglomerate rock in Jack Hills and divided into three sets of grain size: >120μm, 120μm-75μm, <75μm. In the utilizing the technique of laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS), the rates of zircons, which were found to be older than 3.8 Ga in $^{207}Pb/^{206}Pb$ age, were accordingly rated at 16.7%, 4.76%, 5.88%. We interpreted two presumable reasons from the relationship between α-decay damage calculated from the U-Th concentration and the concordance in zircon. First is the difference of the host rock in which each zircon group crystalized. Second is the artificial element when sample rocks are crushed on the method in a laboratory. As a result, it was suggested that large grain is suitable for collecting Hadean zircons including apatite with adequate size to analyze.

References:

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