Oral | Symbol S (Solid Earth Sciences) | S-CG Complex & General

[S-CG61_2AM2]Petrology, Mineralogy and Resource Geology

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Fri. May 2, 2014 11:00 AM - 12:45 PM 311 (3F)
We widely invite presentations in the fields of petrology, mineralogy and resource geology. Especially description of minerals and rocks, investigation of their origin and evolution by field investigation and/or laboratory experiments, and development of new methods are accepted.

12:15 PM - 12:30 PM

[SCG61-P03_PG]Petrographic and geochemical studies of granitoids from the Inbi intrusives, Inner Zone of Southwest Japan

3-min talk in an oral session
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Keywords:granitoid, San-in Belt, XRF, ICP-MS, trace element, REE

We report a data set of whole rock compositions of seven granitoids from the early Paleogene Inbi intrusives and a granitoid from the mid Paleogene Namariyama intrusives, Inner Zone of Southwest Japan. The Inner Zone where voluminous granitic plutons occur is subdivided from the north to the south into three areas in terms of mineralogical and petrological characteristics of granitoids: the San-in Belt, the San-yo Belt, and the Ryoke Belt. The examined Paleogene intrusives, which belong to the San-in Belt, show volcano-plutonic association on the eastern side of younger Daisen volcano at the southern part of Tottori Prefecture and the northern part of Okayama Prefecture [e.g. 1-5].Seven early Paleogene granitoids were collected from three plutons of the Inbi intrusives: Tottori granite, Ningyo Toge granite, and Sangenya granite [4]. Minerals in polished thin sections were first described under microscope. All of the granitoids from the Inbi intrusives contain quartz, feldspars, biotite and iron oxide. Most of them except for Tottori granite contain amphibole. Sphene is found as accessory mineral in some thin sections.Each mixture of lithium tetraborate and powdered rock was put into a platinum crucible, and then ignited in a furnace at 1000 degree-C and cooled for preparing a glass bead. And then, major and trace elements were measured using XRF analyzer. To prepare sample solutions for measuring trace elements including REEs, the powdered rocks were first digested in a PTFE beaker with HF/HClO4 mixture on a hotplate at 120-140 degree-C, and then residue probably including heavy minerals such as zircon was dissolved in sealed high-pressure container with HF/HCl mixture at 180 degree-C. The first step decomposed fraction and residual one were well-mixed, and then this mixture was split into two aliquots: one was separated from other elements using a quartz column filled with cation exchange resin for measuring REEs, and the other aliquot was for analysis of trace elements except for REEs. These solutions were analyzed using ICP-MS.Chemical analyses for whole rock compositions of seven Inbi granitoids yielded the following results. Molecular Al2O3/ (CaO+Na2O+K2O) values are given as I-type

with a range from 0.96 to 1.10. Relationship of Na2O+K2O vs. total FeO vs. MgO shows calc-alkaline series on AFM diagram. SiO2 content ranges from 65.7 wt% to 73.4 wt%, and relationship between Si and other major elements gives clear differentiation trend on Harker variation diagrams. Five samples of the granitoids are categorized as high-K series. Many granitoids in this area suffer weathering. The resulting in weathering yields a decrease of CaO (from 2.5 wt% to 1.7 wt%) and Na2O (from 4.1 wt% to 3.6 wt%) for Ningyo Toge granites. Whereas Sangenya and Ningyo Toge granites contain about 200 to 360 ppm Sr, Tottori granite contains only 90 ppm Sr. The values of Ti normalized by the mean MORB composition [6] against seven granitoids yield a trend of depletion in Ti. Those of REEs normalized by the MORB composition are given as enriched LREE pattern, negative Eu anomaly, and relatively flat MREE and HREE patterns. All of these normalized patterns have characteristics as volcanic arc granites [e.g. 7].References:[1] Shibata, H. and Saruyama (1959) Paper. ITSR, Okayama Univ., 25, 1-12 (in Japanese with English abstract); [2] Shibata, K. and Yamada (1965) Bull. Geol. Surv. Japan, 16, 437-442; [3] Kawano and Ueda (1966) Jour. Mineral. Petrol. Econom. Geol., 56, 191-211 (in Japanese with English abstract); [4] Sasada et al. (1979) Memoir. Geol. Soc. Japan, 17, 19-34 (in Japanese with English abstract); [5] Shibata, K. (1979) Memoir. Geol. Soc. Japan, 17, 69-72 (in Japanese with English abstract); [6] Albarede (2005) Geophys. Monogr. R.D. van der Hilst, J. Bass, J. Matas and J. Trampert. Washington D.C., Amer. Geophys. Union, 160, 27-46; [7] Imaoka et al. (2011) Jour. Asian Earth Sci., 40, 509-533.