

U-Pb ages of Cretaceous granitic and mafic rocks of SW Japan and their geological implication

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The Cretaceous granitic province in Southwest Japan has been subdivided into San-yo zone in back-arc side and Ryoke zone in fore-arc side. The granitoids in the Ryoke zone are classified into Younger Ryoke granitoids and Older Ryoke granitoids.

It has been noticed since old days that the granitoids from the eastern part of SW Japan (Chubu district) give relatively young ages compared to those from the western part (Yanai district). Since 1990s, eastward younging along-arc age variation of these granitoids and a ridge subduction model has provoked hot discussion. But they are based on classical K-Ar and Rb-Sr ages because U-Pb dating had not been done in Japan, then.

After middle 1990s, U-Pb ages of the granitoids and accompanied mafic rocks using ion microprobe and ICP-MS have been documented. They gave the following results.

1) The U-Pb ages of the San-yo zone granitoids and Younger Ryoke granitoids show the polarity of eastward younging from ca. 95Ma to 70Ma.

2) The ages of the Older Ryoke granitoids are nearly constant with rather broad range of 98-85Ma all the way from west to east of SW Japan.

3) The ages of mafic rocks including MMEs, synplutonic dikes and layered gabbros in the Chubu and Kinki districts are distinctly younger than the associated Ryoke granitoids. The ages of mafic rocks are similar to those of the San-yo zone granitoids of similar along-arc positions, seemingly following their along-arc polarity.

Along-arc age variation of the San-yo granitoids is clearly shown by also CHIME ages on the Chubu and Yanai districts (Suzuki and Adachi, 1998).

The results 1) to 3) above lead us to another view that we have not seen.

1. The San-yo and Ryoke granitoids should be re-categorized. The Younger Ryoke granitoids have to be re-defined or re-named in another grouping. Or it may be better to quit the name of San-yo and Ryoke granitoids at least in the meaning so far used.

2. Two types of magmatism took place at the site of the Cretaceous Japanese Islands. One is 95-85Ma plutono-metamorphism which prevailed whole SW Japan. Another one is along-arc traveling magmatism which is now exposed in the erosion level of volcano-plutonic complexes.

3. The mafic rocks now exposed in the Ryoke belt were product of the along-arc traveling magmatism.

Mafic rocks are exposed much less in the San-yo zone compared to those in the Ryoke zone. Mafic magma that intruded in the present San-yo zone may have contributed as a source material of the granitoids of the San-yo zone. Next, we need a tectonic model that allows the apparently crossing two age trends of magmatism in a single geologic site in the tectonic setting of a continental margin.

Keywords: granitic rocks, U-Pb age, SW Japan, Cretaceous, Ryoke/San-yo, gabbro