Collapse of fore-arc crust: Cretaceous Japan case

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For reconstructing geometry of the fore-arc basin developed along the Cretaceous-Paleogene arc-trench system in Japan, provenance analysis has been carried out by U-Pb dating of detrital zircons, particularly for the “Cretaceous-Paleogene” fore-arc sandstones/conglomerates discontinuously traced from western Kyushu to southern Tohoku district. These new age data clarified that terrigenous clastic rocks share the same secular change in age spectra, and suggest the followings. 1) Monotonous sedimentary basin developed in the fore-arc together with relevant provenacne for over 1,300 km along the arc. 2) This spatial dimension of the Cretaceous-Paleogene fore-arc basin in the Japan segment in East Asia requires that its width probably has reached up to 100 km across the arc with respect to modern analogues. 3) The current wodth of 15-20 km was driven by significant removal of fore-arc crust on the order of several tens of kilometer. 4) As to the large-scale crust disappearnce, the low-angle Median Tectonic Line (MTL) in SW initiated probably in the Oligocene, and triggered fore-arc crust shortening to juxtapose the Ryoke (arc granitoid) belt with early Paleogene cover (fore-arc) sediments and the structurally underlying Sanbagawa (blueschist) belt. 5) This crustal shortening was restricted in a domain between central Kushu and northern Kanto, where the initial rifting of the Japan Sea affected.

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