Zircon internal textures and monazite dating of metamorphic rocks of SWG, Sri Lanka

D. N. S. WANNIARACHCHI[1]* AND MASAHIDE AKASAKA[2]

[12]Department of Geoscience, Interdisciplinary Faculty of Science and Engineering, Shimane University, Nishikawatsu-cho 1060, Matsue 690-8504, Japan
*nuwan0sanjaya@gmail.com
[2]akasaka@riko.shimane-u.ac.jp

Southwestern Group (SWG) of Sri Lanka consists of relatively lower grade metamorphic rocks than another part of the Highland Complex. To identify the polymetamorphism in SWG, detailed zircon and monazite internal textural domain analyses have been done for four major rock types. Zircons in the garnet-biotite gneiss contain detrital cores and overgrowths. The detrital cores are commonly rounded or subhedral to euhedral in form, and exhibit oscillatory zoning of magmatic origin. Overgrowth patterns show two to three crystallization stages. The first/second stage of the zircon growth may correspond to the undefined age population of 1100 Ma [1]. The second and/or third stage overgrowths are considered as the zircon grown in the latest metamorphic stage at 550 Ma [1,2]. Zircons in biotite-bearing orthopyroxene-charnockitic gneiss lack detrital cores, and are considered to have formed during the metamorphic stages. Cathodoluminescence images reveal complex sector zonings and three sub-stages of overgrowths, and show fir-tree texture, radial growth, and planar banded zones. The fir-tree texture may represent the significant variation of temperature during the initiation of the zircon crystal growth in first sub-stage; the radial zone of the second sub-stage formed with increasing temperature at high temperature condition; the planner banded zone of the third sub-stage. The detrital core morphology suggests two major Archean sources of the detrital zircons. Monazites in garnet-biotite gneiss show several internal textural domains: oscillatory-zoned, core-rim-type zone, complex zoned, unzoned, inherited core-bearing domains. Preliminary study on monazite CHIME geochronology shows preserved relicts of pre-peak metamorphism as older as 1900 Ma and post-peak metamorphism as younger as 400 Ma. The internal textures of zircon suggest that two steps or three steps of metamorphism, that have not been chronologically defined yet. Present study on monazite and zircons suggests three possible post-peak events. Detailed study of internal textures is quite important to clarify the polymetamorphic history.

[1] Kröner et al. (1987) *J Geol* **95**, 775–791. [2] Hölzl et al. (1994) *Precambrian Res*, **66**, 123–149.