角閃石片麻岩の弾性波速度と岩石微細構造
Elastic wave velocity and microstructures of amphibolite gneisses

小池 寛太[2]、遠藤 弘人[4]、道林 克禎[3]、*渡辺 了[1]
Kanta Koike[2], Hiroto Endo[4], Katsuyoshi Michibayashi[3], *Tohru Watanabe[1]

1.富山大学大学院理工学研究部、2.富山大学理学部、3.静岡大学学術院理学領域、4.静岡大学大学院総合科学技術研究科理学専攻
1.Gradudate School of Science and Engineering, University of Toyama, 2.Faculty of Science, University of Toyama, 3.Institute of Geosciences, Shizuoka University, 4.Graduate School of Science, Shizuoka University

Seismic velocity is one of the most important sources of information about the Earth's interior. For its proper interpretation, we must have a thorough understanding of the dependence of seismic velocity on microstructural elements, including the modal composition, the crystal preferred orientation (CPO), the grain shape, the spatial distribution of mineral phases, etc. We have studied seismic velocities and microstructures of amphibole gneisses. Rock samples of amphibole gneisses were collected at Momose River (Yatsuo, Toyama Pref.). They are mainly composed of quartz (34-36vol.%), plagioclase (18-27vol.%) and hornblende (34-46vol.%). Quartz and plagioclase crystals are almost randomly oriented, while c-axes of hornblende crystals are strongly aligned parallel to the lineation and a-axes perpendicular to the foliation. A rectangular parallelpiped (the edge length ~ 40 mm) was made from rock samples for ultrasonic velocity measurements. Two faces are parallel to the foliation plane, and two faces perpendicular to the elongation direction. Velocity measurements were made under confining pressures of up to 180 MPa at room temperature. The pulse transmission technique was employed by using $Pb(Zr, Ti)O_3$ transducers with the central frequency of 2 MHz. Under the confining pressure of 180 MPa, the fastest compressional wave velocity was observed in the direction parallel to the lineation, and the slowest one in the direction perpendicular to the foliation. Velocities calculated with the VRH averaging scheme reasonably reproduce the measured velocities. The anisotropy in velocity is caused by the CPO of hornblende crystals, though the anisotropy due to aligned hornblende crystals is largely weakened by almost randomly oriented quartz and plagioclase crystals. The influence of the grain shape of hornblende on the anisotropy in velocity will also be discussed in our poster.

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