

Trench-normal seismic anisotropy generated by lawsonite eclogites from the southern Motagua fault zone, Guatemala

김대영 (Kim, Daeyeong)^{1,2,4,*} · Simon Wallis² · Shunsuke Endo³ · 이진한 (Ree, Jin-Han)⁴

¹극지연구소 극지지구시스템연구부

²일본 나고야대학교 지질학과

³일본 시마네대학교 지질학과

⁴고려대학교 지구환경과학과

We present the results of EBSD analyses on extremely fresh lawsonite eclogites from southern Motagua fault zone, Guatemala for understanding seismic properties of subducting oceanic crust. The CPO of omphacite is characterized by (010)[001] with AV_s of 1.4–2.7%, whereas that of lawsonite defined by (001)[010] with 3.4–14.7% AV_s . The seismic anisotropy of lawsonite eclogite is calculated as 1.2–4.1% AV_p and 1.8–6.8% AV_s . Based on an assumption of the high modal abundance and strong fabric of lawsonite, the AV_s of eclogite is estimated as ~11.7% in the case of 75% lawsonite and 25% omphacite. For events that propagate more or less parallel to the maximum extension direction, X, the fast S-wave velocity (V_s) causing trench-normal seismic anisotropy for orthogonal subduction. Our study suggests that lawsonite in both blueschist and eclogite may play the key role in the formation of complex pattern of seismic anisotropy observed in NE Japan: weak trench-parallel in the forearc basin and trench-normal in the backarc.

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