

Seismic attenuation and thermal structures in western Shikoku and Bungo channel: Relationship to low-frequency earthquakes

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We conducted 3-D attenuation tomography using our previous 3-D velocity structure in western Shikoku and Bungo channel region. We then estimated thermal structure by applying parameters about relation of temperature to P-wave attenuation data in order to investigate source region of low-frequency earthquakes (LFEs). We analyzed clear waveform for 973 small earthquakes and 128 Hi-net stations to calculate t^{Δ} attenuation operators through spectral fitting procedure. We have successfully obtained 19,000 P-wave t^{Δ} and 18,500 S-wave t^{Δ} to invert for 3-D frequency independent attenuation tomography. We used this P-wave attenuation to estimate thermal structure by following high temperature background method. The obtained structures show the subducting Philippine Sea (PHS) slab is clearly imaged as low attenuation (Q_p and Q_s of $\sim 400-800$) and low temperature features ($\sim 660-680$ C), respectively. We look at relationship between obtained structures and LFEs. The LFEs occur in a region of high attenuation (Q_p and Q_s of $\sim 200-250$) and moderate high temperature ($\sim 680-700$ C), respectively.