

P-wave velocity structure of the mantle beneath the South Pacific superswell from seismic experiments at ocean floor and islands

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Three-dimensional P-wave velocity structure of the mantle beneath the South Pacific superswell is determined to depths of 1600 km through passive broadband seismic experiments at the ocean floor and islands in the period since 2003 to 2005. We have collected approximately 1500 relative times of long-period P-waves by using a waveform cross-correlation. PREM is used for an initial reference. Then, ellipticity corrections are applied and a linear trend as a function of a epicentral distance is removed from the relative times to obtain travel time residuals for each event. The residuals are used for delay time tomography. The resultant structure shows lateral heterogeneity with the magnitude of approximately $\pm 1\%$, in which a distinct low velocity region is found beneath the north of the Society hotspot and the center of the superswell at a depth of 1600 km. At 1200 km depth, it changes the pattern, which linearly occurs beneath the Society to Pitcairn hotspots. Another low velocity region is obliquely elongated from 800 km to 400 km depth toward the Marquesus hotspot. An isolated low velocity region is identified beneath the Society hotspot at 400 km depth. These features are generally consisted with those obtained by global tomography that contains the P-wave travel times newly observed here, which is particularly discussed in another paper by Obayashi et al. in this session.