

## Anelastic strain recovery in ocean floor sediments reveals extension across SW Japan subduction zone

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Sediment dominated convergent margins typically record substantial horizontal shortening often associated with great earthquakes. The convergent margin south of Japan is arguably one of the most extensively investigated margins, and previous studies have documented extensive evidence for accretion and horizontal shortening. Here, we show results from anelastic strains recovered from three partially lithified sediment samples (ca 40% porosities) across the southwest Japan accretionary prism and propose that the shallow structural levels of the margin (to at least 900 m) are dominated by horizontal extension rather than compression. The anelastic strain results are consistent with stress directions interpreted from two independent techniques - bore hole breakout orientations and core-scale fault data. The anelastic strain axes are also oblique to bedding and, at one site, oblique to fabrics defined by AMS. The AMS fabrics dip steeply, consistent with horizontal tectonic stresses and shortening. Based on the pervasive occurrence of late-stage normal faults and the ASR data, we interpret the AMS data to reflect remnant fabrics from an earlier phase of shortening. We propose that the current state of stress reflects the relatively recent (<1 million years) underthrusting of a thick sediment pile that increased the wedge taper and weakened the decollement.

Keywords: Nankai Trough subduction zone, anelastic strain recovery, borehole breakout, fault-slip analysis, anisotropy of magnetic susceptibility, extension