

## Hydrogeological properties at the toe of the Nankai accretionary prism, combining drilling and petrophysical data from Hole Coo24A - IODP Expedition 358

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Nankai Trough is a locus of slow slips and low-frequency earthquakes. High pore pressure is assumed to contribute to their generation but direct evidence of overpressure has not been provided. We contribute to the understanding of the hydraulic regime within the Nankai accretionary prism by integrating drilling and logging data to get a full picture of hydraulic properties along the hole Coo24A that intersected the Nankai décollement at 813 mbsf, about 3 km from the trench.

Pore pressure was estimated using Eaton's method on both drilling and sonic velocity data. Both results predict local pore pressure gradients rising up to 1.33–1.42g/cm<sup>3</sup> and pore pressure rise up to 10% above hydrostatic within the borehole, especially when crossing the décollement.

DownHole Annular Pressure was monitored during drilling and a careful reanalysis of its variation shows localized inflow of fluids from the formation along the borehole. The two asymmetrical damage zones (footwall) below the décollement are especially permeable with significant high porosity and permeability with orders of magnitude between  $\sim 10^{-16}$  to  $10^{-18}$  m<sup>2</sup>.

Our results show that the formation fluids are getting significantly over-pressurized only a few hundreds of meters from the toe of the décollement. The décollement is already impermeable across the fault and the fluid flow is channelized along the damage zone of the décollement. The research will furthermore investigate other drilled wells to understand the pressure transient history and correlate these properties with the formation of slips and low-frequency earthquakes in the study area.

**Mots-Clés** : Fault hydrogeology; Pore pressure; Permeability; Nankai subduction zone; NantroSEIZE; IODP