Preliminary results from IODP Expedition 371: Tasman Frontier Subduction Initiation and Paleogene Climate

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International Ocean Discovery Program (IODP) Expedition 371 drilled six sites in the Tasman Sea from 27 July to 26 September 2017. The primary goal was to understand Tonga-Kermadec subduction initiation through recovery of Paleogene sediment records. Secondary goals involved understanding regional oceanography and climate since the Paleogene. The cored intervals at five sites (U1506–U1510) sampled calcareous ooze or chalk that contained volcanic or volcaniclastic intervals with variable clay content. Paleocene and Cretaceous sections range from more clay rich to predominantly claystone. At the final site (U1511), a sequence of abyssal clay and diatomite was recovered. All six sites provided new stratigraphic and paleogeographic information that can be put into context through regional seismic-stratigraphic interpretation in northern Zealandia and hence provide strong constraints on geodynamic models of subduction zone initiation. Our new observations can be directly related to the timing of plate deformation, the magnitude and timing of vertical motions, and the timing and type of volcanism. Calcareous ooze blankets a large area of the modern seafloor above the CCD. With time and burial, this ooze can become compacted and altered to chalk and ultimately limestone. Reduction in porosity and lithification over the transition zone from ooze to chalk has long fascinated the marine geoscience community, as it affects the velocity of seismic waves, the recovery of core, and the nature of calcareous components. Cores and physical property data from Expedition 371 provide new empirical data to quantify complex relationships between sediment composition, burial history, compaction, and diagenesis and may help clarify our understanding of the underlying processes. The ooze–chalk transition was found at between ~55 and 290 m at five sites. The depths appear related to differences in age, compaction, sediment composition, and missing overburden that was lost by slumping.

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