

Ages of sequence boundaries based on the core analysis of IODP Expedition 317 and their correlation between shelf and slope on the basis of reinterpretation of the seismic profiles, offshore New Zealand

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The Canterbury Basin is located on the eastern margin of South Island of New Zealand, and underlies present-day onshore Canterbury Plain and offshore continental shelf. The seismic surveys and industrial and scientific drillings have been carried out in this area. Lu and Fulthorpe (2004) recognized 19 sequence boundaries since middle Miocene and determined those ages in the seismic profiles. IODP Expedition 317 drilled three sites on the shelf (U1351, U1353 and U1354) and one site on the upper slope (U1352) in 2009 and 2010. Hoyanagi et al. (2014) showed the Pleistocene age model based on the correlation between benthic foraminiferal oxygen isotope records from the U1352 and LR04 stack (Lisiecki and Raymo, 2005). Formation ages of sequence boundaries on the basis of this age model did not coincide with those of Lu and Fulthorpe (2004). This study reinterpreted seismic sequence boundaries in the seismic profiles and tried to correlate them with discontinuities in the cores from the IODP sites. As a result, we recognize seven discontinuities in the cores, which placed the same depth of the seismic sequence boundaries in the profiles. We recognized them as the sequence boundaries and named them SB1 to SB7 in descending order. Based on the revised age model of the U1352, the sequence boundaries SB 1 to 6 were formed during the lowstand stage of MIS 6, 8, 16, 22 and 54 respectively. While, the discontinuity represented hiatus between 2.7 and 1.8 Ma on shelf and slope sites coincide with the sequence boundary SB7. The sequence boundary SB3 cut below two sequence boundaries in the seismic profiles, and it might indicate that the lowering of sea level at the MIS 16 has been greater than the other glacial stages.

Keywords: IODP Expedition 317, Seismic profiles, Pleistocene, Sea-level change, New Zealand