

Figure F1. A. Regional map of New Zealand and vicinity. B. Map of the transect area for Expeditions 372 and 375, offshore North Island (simplified from Barnes et al., 2019). Heavy black line indicates track line for seismic reflection profile crossing Site U1517. C. Seismic reflection profile crossing Site U1517. Interpretations of the Tuaheni landslide and gas hydrate stability are from Barnes et al. (2017). TWT = two-way traveltime.

Figure F2. Generalized stratigraphic column with identification of lithologic units and potential slip surfaces, Site U1517 (modified from Barnes et al., 2019). The weak layer at ~31 mbsf is from Barnes et al. (2019), and the base of the anomalous pore water chemistry at ~41 mbsf is from Luo et al. (2020).

Figure F3. Representative X-ray diffractograms for oriented clay-sized specimens, Site U1517. Diagnostic peaks for computation of weight percent are indicated for smectite (001), illite (001), undifferentiated chlorite (002) + kaolinite (001), and quartz (100). Subsidiary peaks for individual clay minerals and quartz are also shown. The saddle:peak intensity ratio for smectite (001) was used to determine %expandability (Rettke, 1981). The 2θ position of the illite (002)/smectite (003) (I/S) peak was used to determine %illite in the I/S mixed-layer clay (Moore and Reynolds, 1989a). Weight percent values for minerals in each specimen were computed using regression equations (Table T1).

Figure F4. Generalized stratigraphic column with normalized relative-abundance values of minerals in the clay-sized fraction, Site U1517 (modified from Barnes et al., 2019). Weight percent values were computed using regression equations (Table T1). XRD results and statistics are tabulated in Table T3. Designation of the creeping slide interval (Units I–III) is from Barnes et al. (2019). The weak layer at ~31 mbsf is based on shipboard shear strength measurements (Barnes et al., 2019).

Figure F5. Stratigraphic distribution of normalized relative-abundance values of total clay minerals in the bulk hemipelagic sediment (from Barnes et al., 2019) and weight percent values for individual clay minerals in the bulk hemipelagic sediment, Site U1517. The weak layer at ~31 mbsf is based on shipboard shear strength measurements (Barnes et al., 2019). XRD results and statistics are tabulated in Table T3.

Figure F6. Stratigraphic distribution of values of expandability for smectite + illite/smectite (I/S) mixed-layer clay, %illite in I/S mixed-layer clay, and illite crystallinity (Kübler) index, Site U1517. XRD results are tabulated in Table T2. Boundaries between zones of diagenesis, anchimetamorphism, and epimetamorphism (from Warr and Ferreiro Mählmann, 2015) are meant to provide a qualitative reference frame for geologic conditions in generic detrital source areas.