Supplemental File 2: STATISTICAL ANALYSIS AT THE SCALE OF THE BOREHOLE

The iterative nonhierarchical cluster analysis (INCA) clusters (C1–C10) for M0027, M0028, and M0029 are plotted against depth in meters below seafloor, and shown both as a column and as individual clusters. Each cluster is colored to loosely correspond to lithology (see Table 2). Thus, cluster C1 is yellow (sand); clusters C2, C3, C5, C6 and C10 are in shades of brown and/or red (silts and clays); and clusters C4 and C7–C9 are shades of green or purple (glauconite-containing sediments), where the purple indicates higher U. Note that there are small intervals where the gamma-ray log was at the lower limit of its resolution with data points at these depths removed prior to the statistical analysis. This is apparent from a small gap (white space) in the INCA column; in the separated clusters, intervals of highest density appear black due to the outlining used around clusters. Lithological units and subunits are shown to the far left, with upward of 40 within the Miocene sequences (Mountain et al., 2010) that generally correlate with statistically identified boundaries (Table 4 and as shown in more detail by "INCA divisions and subdivisions within this Supplemental File). As lithological boundaries are only defined where core was recovered, accordingly where core recovery is low in the upper 200 m slight differences are apparent between lithological boundaries and the clearest INCA subunits in M0027 (0.5-3 m) with occasional larger differences in M0029 (see contrast between statistical and sedimentological boundaries, "INCA divisions and subdivisions," M0029 within Supplemental File 2). Where boundaries do not correlate, this can also reflect the fact that lithological units attempt to group genetically correlative sediments; this is rarely possible from analysis of spectral gamma ray alone. The lithology column, estimation of glauconite content (0%–90%), and the inferred depth of seismic reflectors are shown to the right of the depth scale (Mountain et al., 2010; Miller et al., 2013b). The logs input into the statistical analyses (K, U, and Th) are displayed to the far right with the location of the examples shown in Figures 5 and 6 (gray bars) and Figure 3 (asterisks) indicated. The text column describes selected cluster characteristics and variations within INCA divisions (gray text). Distinctive cluster patterns (brown text) and selected cluster changes at sequence boundaries (red text) and flooding or transgressive surfaces.





