

Grain size and mineral analyses are used to help understand the complex late Tertiary stratigraphy of the Delmarva Peninsula (MD-DE). During the last several glacial-interglacial cycles, the combination of glacioisostasy and sea level fluctuation caused severe fluvial incision into the Miocene Choptank Formation and resulted in localized paleochannels. This eroded topography provided the accommodation space for the deposition of the Pleistocene Kent Island Formation. These deposits include reworked Miocene material that is difficult to differentiate from non-reworked Choptank clays in sediment cores. The goal of this study is to use grain size and clay mineral analyses to test whether we can distinguish the in situ Choptank clays from the Choptank clays that are reworked in the Kent Island Fm. The grain size and mineralogy samples were collected from the Black Water National Wildlife Refuge (Dorchester County, MD), and analyzed using both Beckman Coulter LS 230 Laser Diffraction Particle Size Analyzer and Rigaku MiniFlexII X-Ray Diffractometer respectively. Samples for grain size analysis were prepared by removing organic matter. For grain size analysis samples were processed known to be in situ and reworked to develop particle size distribution for both populations. These distributions were used to test the unknowns. For XRD analysis, standard sample preparation techniques were employed in addition to using glycolation sample preparation to identify the presence of possible expandable clay minerals. Preliminary results show identifying peaks of high intensity in the lower angles of 2θ space. Specifically a peak was found between 12-13 degrees in many of the Miocene samples. In the process of this reworking, these clays may have disintegrated. The grain size analysis results indicate that the Miocene is less well sorted, indicated by multiple concentrations in grain size. This is a contrast to the well-sorted Pleistocene samples. By combining results from both methods this procedure can be used to differentiate in situ and reworked Miocene sediments in this region.