Chemical and Mechanical processes during burial diagenesis of chalk

Burial diagenesis of chalk is a combination of mechanical compaction and chemical recrystallization as well as cementation. We have predicted the characteristic trends in specific surface resulting from these processes. The specific surface is normally measured by nitrogen adsorption but is here measured by image analysis of scanning electron micrographs. This method concentrates on the micritic matrix alone. Deepsea sediments are ideally suited to the study of burial diagenesis because they accumulate in a relatively conservative tectonic setting. We used material from the Ontong Java Plateau in the Pacific, where a > 1 km thick package of chalk facies sediments accumulated from the Cretaceous to the present. In the upper 200-300 m the sediment is unconsolidated carbonate ooze, throughout this depth interval compaction is the principal porosity reducing agent, but recrystallization has an equal or larger influence on the textural development. In the chalk interval below, compaction is not the only porosity reducing agent but it has a larger influence on texture than concurrent recrystallization. Below 850 m grain-bridging cementation becomes important resulting in a lithified limestone below 1100 m. This interpretation is based on specific surface data alone, and modifies current diagenetic models.