Reports

A Re-examination of the Use of the Silt/Clay Ratios as Indicators of Sedimentary Environments: A Study for Students*

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The size frequency curve in Figure 2 illustrates the various major fractions of sediment subjected to textural analyses. In the use of silt/clay analyses many advantages over a similar analyses on the ratios of coarser clastics may be considered as follows: (1) if no coarse material is present, the silt and clay fractions can still be used for interpretative purposes; (2) the fine fractions (silt and clay) emphasize the aspect of low energy fields; (3) by using only the silt and clay, the analysis is not affected by erratic or spurious occurrences of the coarser fractions; (4) the analysis is not affected by errors common to the analysis of coarse material; and (5) the analysis affords a simple method of calculation.

Many investigators such as Douglass (1946), Favejee (1960), Van Straaten (1963), Nota and Loring (1964), Brambatti and Venzo (1967), and Nota and Loring (1964) found that the silt/clay ratio was higher in the marine environment than in the non-marine sites of deposition. Many aspects such as mineralogy, electrolytic action of the salts in sea water and the presence of organic substance must be considered in the deposition of silt and clay particles and consequently the resulting silt/clay ratio of the deposit. However, other factors must also be considered when interpreting the significance of this ratio. These factors include the following: the mean grain diameter of the sediment sample; the distance of the sampling site from shore; the depth of water over the sampling site; the available size of sedimentary source material; the availability of transporting energy present from the sedimentary source to the site of deposition; and the inter-relationship of all these factors. It is the purpose of this study to demonstrate these relationships with the silt/clay ratio as a means of understanding sedimentation in various environments.

Methodology

The present study was designed to accommodate most aspects affecting the variability of the silt/clay ratio as observed from the textural analysis on the bulk sample. Samples were studied from both the marine and non-marine water bodies, and from depths of water ranging from those in the inshore zone to those at the bottom of major basins lying beyond the continental shelf. It was also important to consider the aspect of varying hydrodynamic vigour and velocity associated with different sedimentary environments, and to compare sedimentation in different geographic areas. For these reasons the following sites were selected (Fig. 1): (1) Northern Baffin

Figure 1 - Location of study areas.

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