REDUCING SAND SAMPLE VOLUMES BY SPOONING

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"Spooning" is a method of obtaining small (20 g), representative subsamples of sand, or other free-flowing materials, without resorting to multiple, successive splitting operations. A spoon subsample is obtained by rapidly pouring the entire original sample onto a flat tray to form a cone-shaped mound, thrusting an ordinary teaspoon to the center of the mound (the line of thrust at about 45° to the horizontal), and lifting the spoon from the mound in a vertical direction with the bowl of the spoon in a horizontal position.

The method was conceived and tested in an attempt to reduce the excessive time and handling required to produce approximately 20 g subsamples (from 1 to 2 kg sand samples) for settling velocity analysis in a modified (Benthos) Woods Hole Rapid Sediment Analyzer.

Comparisons of median settling velocities of split and spooned subsamples, one involving 34 pairs of subsamples, a second involving 12 pairs of subsamples, yielded correlations between observed median settling velocities of 0.994 and 0.995. Comparisons of the 10th and 90th percentile velocities, on the same two groups of subsamples, yielded r = 0.993 and 0.994 for the 10th percentile and r = 0.952 and 0.960 for the 90th percentile velocities. The 10th percentile velocity being the lowest settling velocity of the coarsest 10 percent of the subsample, and the 90th percentile velocity the highest settling velocity of the finest 10 percent of the subsample.

It is suspected that the excessive amount of handling required to split a large sand sample down to 20 g subsamples does more harm than good, and spooning of samples weighing more than 0.5 kg is recommended, provided that adequate comparisons of traditional and spooned samples are performed.

A METHOD FOR IMPREGNATING UNCONSOLIDATED CORES AND SLABS OF CALCAREOUS AND TERRIGENOUS MUDS

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INTRODUCTION

Core studies of recent unconsolidated sedimentary deposits provide continuous sedimentary records from which 3-dimensional facies relationships can be established. Freshly split cores, if properly prepared, are adequate for studying sedimentary structures and textures, but for only short periods of time. Surfaces of wet cores easily smear or become disrupted by excessive handling and often desiccate; studies of long duration require long-term storage of unconsolidated sediment cores which does not necessarily preserve sedimentary features. To enhance sedimentary features and to prevent irreparable damage to core material, methods have been developed to impregnate sediments with plastic resins which preserve and make cored sediments durable for long-term study (see Bouma, 1969).

Ginsburg et al. (1966) describe a method for impregnating whole cores of unconsolidated calcareous sediments with polyester resin. The drawback to this method is drying the sample. Oven drying causes shrinkage and desiccation cracks that disturb sedimentary structures of muddy sediments (see Ginsburg et al., 1966, Fig. 9). Bouma (1969) describes several techniques for impregnating cored sections of clean sands, but these methods are inappropriate for thick slabs or whole cores of fine calcareous or terrigenous muddy sediments. Bouma describes techniques for impregnating small samples of terrigenous muds, but these methods are laborious and basically for clay fabric studies (Bennett et al., 1977; Martin et al., 1979).

This report describes a method to quick-freeze and freeze-dry sediments to remove interstitial water in 7.8 cm diameter cores or thick (1.5-2.0 cm) slabs of calcareous and terrigenous muds. Rapid freezing of the pore waters with liquid nitrogen and sublimation in a heat-controlled vacuum chamber prevents shrinkage of muddy sediment. This method best preserves the original porosity and permeability of the muddy sediments, a procedure which favors better transmissivity for plastic resin impregnation.