

EaES 350 Laboratory 2: Unconsolidated sediments

The vast majority of sedimentary rocks form from sediments that are initially unconsolidated. In addition, a substantial part of the Earth's surface is covered with loose deposits that may or may not eventually lithify into sedimentary rocks. The proper characterization of unconsolidated sediments is of major importance not only as a first step towards unraveling the origin of the deposit of interest, but also for a broad range of applications. To mention a few examples, unconsolidated sediments are widely used as construction materials (sand, gravel, clay) and large volumes of groundwater (with associated pollutants!) flow through the shallow subsurface.

The purpose of this lab is to have you examine nine different sediment samples, and to make a first attempt at inferring how they may have been formed. Later during this course you will learn a lot more about the origin of sediments like the present ones, but it is never too early to make a start!

1. The first step is to provide a comprehensive description of each of the sediment samples, based on macroscopic and microscopic analysis. Following is a list of features that should be considered, but be aware of the fact that the various parameters may not be relevant to every sample.

- Wherever possible, determine the median grain-size range using the “sand wheel”, and classify the deposit using Fig. 2.2 from your textbook
- Estimate the sediment sorting (Fig. 2.8) and roundness (Fig. 2.9) of the grains
- Characterize the mineralogy, as far as possible
- Give an assessment of whether the sediment samples are composed of lithic fragments and/or biogenic particles
- Infer the textural maturity (Fig. 2.11) of the various sediments

2. Assume that each of these samples has been lithified. Use the Pettijohn (Fig. 2.6) and Dunham (Fig. 3.2) schemes to classify the hypothetical sedimentary rocks.

3. Speculate on the mode of transport and environment of deposition for each of the samples.