Earth 333 Sedimentology
Lab 1
Unconsolidated Sand

In this week's lab you will be determining the geological history and depositional environment of unconsolidated sand samples. Individual questions will introduce you to key techniques such as determining the lithology of a sand sample, estimating percentages and sorting, classifying samples, identifying important surface textures, and finally interpreting the results. We will be reviewing the depositional environments of a few of the samples in lab next week.

General Instructions

- **Identify the samples in your answers**
- **Reference material: Chapter 3 in Boggs and Chap. 2 in Nichols**

SORTING & MATURITY

QUESTION 1

a) Describe the composition of this sand (list all minerals and estimate %, rock fragments, bioclasts etc).
b) Describe the sorting of this sand (verbally and phi scale).
c) What is the roundness and sphericity (numerical) of the most common constituent of this sand?
d) What is the stage of textural maturity of this sand?

QUESTION 2

a) Describe the composition of this sand (list all minerals and estimate %, rock fragments, bioclasts etc).
b) Describe the sorting of this sand (verbally and phi scale).
c) What is the roundness and sphericity (numerical) of the most common constituent of this sand?
d) What is the stage of textural maturity of this sand?

QUESTION 3

a) How does textural maturity differ from compositional maturity? Are the two related? Explain and give examples.

QUESTION 4

a) Estimate the mode of the sample (most commonly occurring particle diameter).

QUESTION 5

a) What does it mean for a sample to be unimodal, bimodal, or polymodal? What does this tell you about the depositional history of the sediment?

BIOCLAST IDENTIFICATION

QUESTION 6

a) Identify as many different bioclasts as you can.
b) What does the presence of bioclasts in a sand sample tell you about its depositional environment?

QUESTION 7

a) Identify as many different bioclasts as you can.
b) Name and estimate the percentage of the pink material.

SAND CLASSIFICATION AND INTERPRETATION

QUESTION 8

a) Describe the composition of this sample (list all minerals, rock fragments, bioclasts etc).
b) State the percentages of the three main components used to classify sands and plot on the ternary diagram.
c) Name your sample based on the ternary diagram.

QUESTION 9

a) Describe the composition of this sample (list all minerals, rock fragments, bioclasts etc).
b) State the percentages of the three main components used to classify sands and plot on the ternary diagram.
c) Name your sample based on the ternary diagram.
d) Describe the sorting of this sample (verbally and phi scale).
What is the roundness and sphericity (numerical) of the most common constituent of this sand?
e) Describe the surface textures of the two most common constituents.
f) Based on your previous observations, discuss the geological history and depositional environment of this sample. Your discussion should include parent rock lithology and location, potential chemical and climate conditions at the source area, time and distance of transportation, characteristics and suggestions of the depositional environment. Explain your reasoning and use the charts included with the lab as aids.

QUESTION 10

a) Identify the composition (minerals, rocks, bioclasts) of one of sample A or B.
b) Discuss the geological history and the depositional environment of this sample.
Your discussion should include parent rock lithology and location, potential chemical and climate conditions at the source area, time and distance of transportation, characteristics and suggestions of the depositional environment. Explain using your observations of sorting, texture, maturity, lithology etc. Use the charts included with the lab as aids.

QUESTION 11

a) In this lab we used Folk's QFR classification to name sand. When might this system not be appropriate? Explain and give an example.