Proposed Sediment Classification Scheme for NGDC sediment core database
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Introduction

The following is a proposal for a simple sediment classification/data entry scheme to be integrated into the NGDC Core Curator's Database. The proposal addresses two issues related to the classification of sediment data: 1) the nature of input data and 2) the specific procedures for sediment classification. In general, the development of this scheme was driven by two objectives:

1. produce a classification scheme that uses similar names as the Ocean Drilling Project (ODP) in recognition of the fact that the majority of sediment described from the ocean basins is classified with the modified ODP scheme
2. develop an integrated classification/data entry that is as simple as possible to utilize because the quality of sediment description is extremely variable and most repositories don't have sufficient personnel to complete comprehensive analyses (most of the cores in the current NGDC database do not have lithologic information).

Basic Elements

The basis for the development of the simple sediment classification (SSC) was to use the sediment names produced by the Mazzullo et al. modified sediment classification currently utilized by the ODP (see ODP Handbook for Shipboard Sedimentologists Tech. Note 8, Appendix I, 1987). The minimum amount of data needed to assign a particular sediment name to a sediment sample was determined. The ODP scheme consists of a **principal name** with **major** and **minor modifiers**, e.g. quartz sand with forams. The principal name is derived from first plotting the % of the main sediment classes (pelagic, volcaniclastic, siliciclastic, and neritic) on a rectangular diagram (fig. 1). The SSC modifies the ODP scheme by eliminating the mixed sediment class and subdividing the sediment classification diagram into four equal quadrants instead of five. Principal names for each of the major classes are listed below. At the bottom of each list is the minimum information that is required to assign a specific name if the sediment falls within that class.

It is proposed that the SSC uses the same sediment classes and principal names as the ODP classification (granular sediments), with the exception of the mixed sediment class.

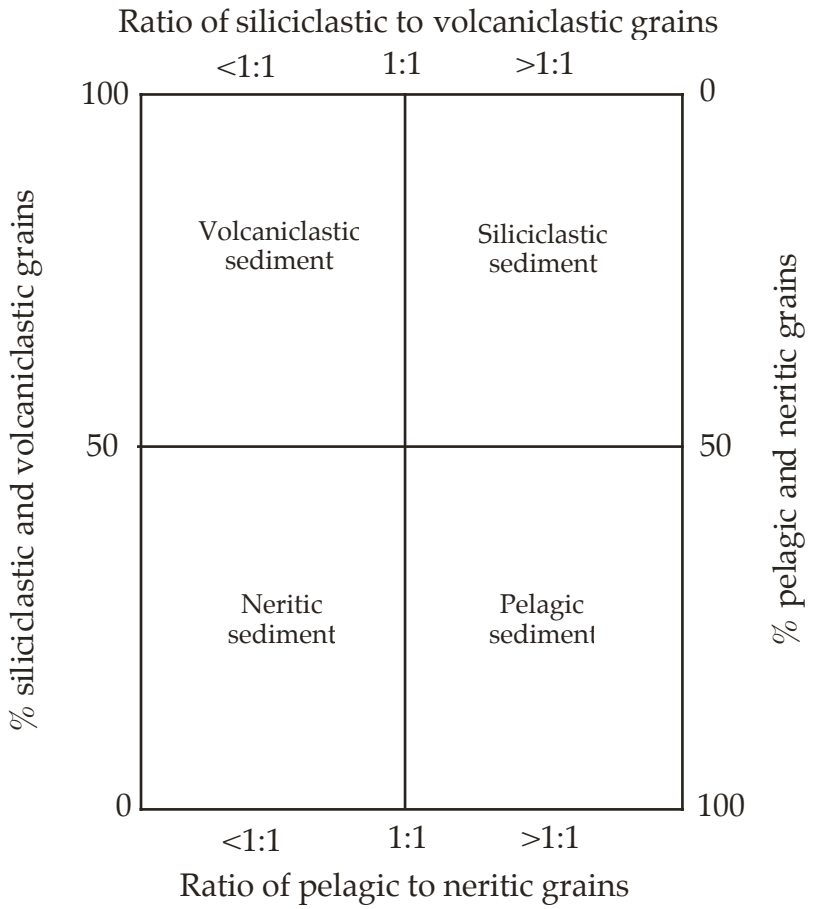

Figure 1. Diagram showing the classes of granular grains

Principal Names of the Four Major Sediment Classes

I. Pelagic
Ooze
Chalk
Limestone
Radiolarite, diatomite, spiculite
Chert
(*type of predominant biogenic grain, consolidation of sediment*)

II. Neritic
Boundstone
Grainstone
Wackstone
Mudstone
Floatstone
Rudstone
(*type of predominant biogenic grain, consolidation of sediment*)

III. Siliciclastics
Gravel
Sand
Silt
Clay
(*grain size of sediment, relative abundance of different grain sizes, consolidation of sediment*)

IV. Volcaniclastic
Breccia
Lapilli
Ash/tuff
(*size of volcanic particles*)

The sediment class can therefore be determined if the **total %** of the four classes are known. With the addition of grain size, sediment consolidation and predominant particle type it is also possible to derive the principal name for each sediment class.

The major modifier for a sediment name is derived from the composition and texture (grain size) of the principal grain type (in excess of 25%). The minor modifier also uses the composition and texture of grain types, but on particles that constitute 10-25% of the sediment. It is proposed that the SSC focuses mainly on the composition of particles for determining the major and minor modifiers.

Data Inputs for the SSC

Based on the sediment classification structure outlined above, the minimum data inputs necessary to provide a basic sediment classification are as follows:

1. sediment consolidation (soft, firm, hard) **(*select from pop-up list*)**
2. total % pelagic components ***(enter numeric value)***
3. major pelagic component (>25%) **(*select from pop-up list*)**
4. minor pelagic component (10-25%) **(*select from pop-up list*)**
5. total % siliciclastic components ***(enter numeric value)***
6. major siliciclastic components (>25%) **(*select from pop-up list*)**
7. minor siliciclastic components (10-25%) **(*select from pop-up list*)**
8. total % volcaniclastic components ***(enter numeric value)***
9. major volcaniclastic components (>25%) **(*select from pop-up list*)**
10. minor volcaniclastic components (10-25%) **(*select from pop-up list*)**
11. grain size (gravel, sand, silt, clay) **(*select from pop-up list*)**
12. total % neritic grains ***(enter numeric value)***
13. major neritic components (>25%) **(*select from pop-up list*)**
14. minor neritic components (10-25%) **(*select from pop-up list*)**
15. neritic fabric support (grain, matrix, mud) **(*select from pop-up list*)**
16. neritic grain size (< 2 mm, > 2 mm) **(*select from pop-up list*)**

Example of a pop-up list for pelagic components

Nannofossils
Foraminifers

Radiolarians
Diatoms
Sponge spicules
Silicoflagellates

Using a series of conditional statements a program could be developed that classifies the sediment using the inputs listed above and the naming conventions of the ODP classification.

Advantages of the SSC

1. Could be implemented with less training of the sediment describer, i.e. the person would not be required to identify very minor and trace components. In addition, there would not be the need to precisely quantify every component in the sediment.
2. Reduce the amount of time necessary for sediment description because components could be grouped into "larger categories".
3. Easier data entry. The SSC would have only16 categories of potential data input.
4. Ability to reproduce sediment names used by ODP with less time consuming examination.

Disadvantages of the SSC

1. Sacrifices the details of individual component analysis
2. More concerned with describing the main sedimentary components of the sample and not the complete composition.
3. Retains the use of some cumbersome terms from the ODP classification