SEDIMENT CLASSIFICATION

The system of sediment classification used in this volume modified from Kaharoeddin et al. (1988). This classification is based on abundance estimates of constituent particles (from smear slide observations) and megascopic examination.

The three major groups of sediment are (Figure 3):

I. Pelagic sediments, consisting of pelagic clay, siliceous ooze, calcareous ooze, or mixtures of siliceous and calcareous ooze;

II. Transitional sediments consisting of mixtures of biogenic and clastic sediments; and

III. Terrigenous and volcanic detrital sediments.

Pelagic Sediments

Pelagic Clay

This type of sediment accumulates at a very slow rate and generally has a brown hue. Authigenic components are common (5% or more in estimated abundance), however, they may be present only in small quantities and distributed in such a manner that they are not found on the smear slide. Usually, a careful examination of the core, aided by the smear slide analysis, is necessary to determine whether or not a sediment is a pelagic clay. The primary components of pelagic clay are clay minerals and silt-size quartz particles, and the clay may contain less than 30% biogenic components. A qualifier cannot be added to pelagic clay; hence, pelagic clay containing 25% diatoms is not called diatomaceous pelagic clay.

Pelagic Biogenic Sediments

Included in this group are sediments containing at least 30% biogenic skeletons, but containing less than 30% silt and clay. They are named according to their principle fossil types: diatomaceous ooze, radiolarian ooze, siliceous ooze, foraminiferal ooze, nannofossil ooze, or calcareous ooze. A second (lesser) biogenic component may be used as a qualifier if more than 15%. The following rules apply for naming pelagic biogenic sediments:

1. If both the principal and lesser fossil types are similar in their chemical composition (i.e., calcareous or siliceous), the sediment may be called a siliceous ooze or calcareous ooze, depending on its chemical composition.

2. Calcareous sediment that has unspecified carbonate more than one-third of the total carbonate is called calcareous ooze.

3. If the principal and lesser fossil types differ in chemical composition, then both components are used in the sediment name, joined by a hyphen (e.g., diatomaceous-foraminiferal ooze).

Transitional Biogenic Sediments

Included in this group are sediments containing at least 30% silt and clay. Two subdivisions are recognized: the transitional siliceous sediments having at least 15% diatoms but less than 30% calcareous skeletons, and transitional calcareous sediments having at least 30% calcareous skeletons. The following rules apply for naming transitional biogenic sediments:

1. A transitional siliceous sediment is called muddy diatomaceous ooze if diatoms are more abundant than silt and clay; otherwise, it is called diatomaceous mud.

2. The transitional calcareous sediments are named according to their principal fossil types: marly foraminiferal ooze or marly nannofossil ooze. If the lesser biogenic component exceeds 15%, the sediment is called marly calcareous ooze.

Terrigenous and Volcanic Detrital Sediments

Terrigenous Detrital Sediments

Sediments in this group are classified according to their texture as defined by the standard size classes of sediment according to Friedman and Sanders (1978; Figures 4 and 5). Sand/silt/clay ratios, based upon optical examination of smear slides, are presented in Table 2 at the end of the core-log description section. These ratios are used to assist in classification of terrigenous sediments. The following rules apply for sediments that are primarily composed of mixtures of sand, silt and clay:

1. The sediments are named after their major clastic component (end-member) if that component is greater than or equal to 70% (i.e., sand, silt, clay).

2. Sediments containing a mixture of silt and clay greater than or equal to 70% are called mud.

3. Sediments containing between 30% and 50% sand are named: sandy silt if the silt content is between 50% and 70%; sandy clay if the clay content is between 50% and 70%, or sandy mud if the mud content is less than 70%.

4. Sediments containing between 50% and 70% sand and between 30% and 50% mud are called muddy sand.

5. Sediments containing a minor component between 15% and 30% (e.g., diatoms or pebbles) should have a qualifier (e.g., diatomaceous muddy sand).

Pebbles are seldom encountered as a distinct sedimentary unit in marine sediments except in glacial marine sediments. The following rules apply to the naming of sediments that consist primarily of pebbles:

1. Sediments containing 70% or more pebbles are called pebbles.

2. Sediments containing between 50% and 70% pebbles and between 30% and 50% either mud or sand are called muddy pebbles or sandy pebbles, respectively.

Pebble units often contain finer matrix sediment, some or nearly all of which may be washed away during core retrieval or transportation. Removal of matrix sediment by washing is usually easily identified during core description. If the matrix sediment constitutes more than 10% of a pebble unit, the composition of the matrix is mentioned.

In graded sequences in which the size of the particles ranges from one textural class to another (e.g., silt to sand), the term *graded clastics* is used as the name of the unit. If the size of the particles ranges within one textural class, the unit is named according to its textural class (e.g., "sand, yellow gray (5Y 7/2), graded").

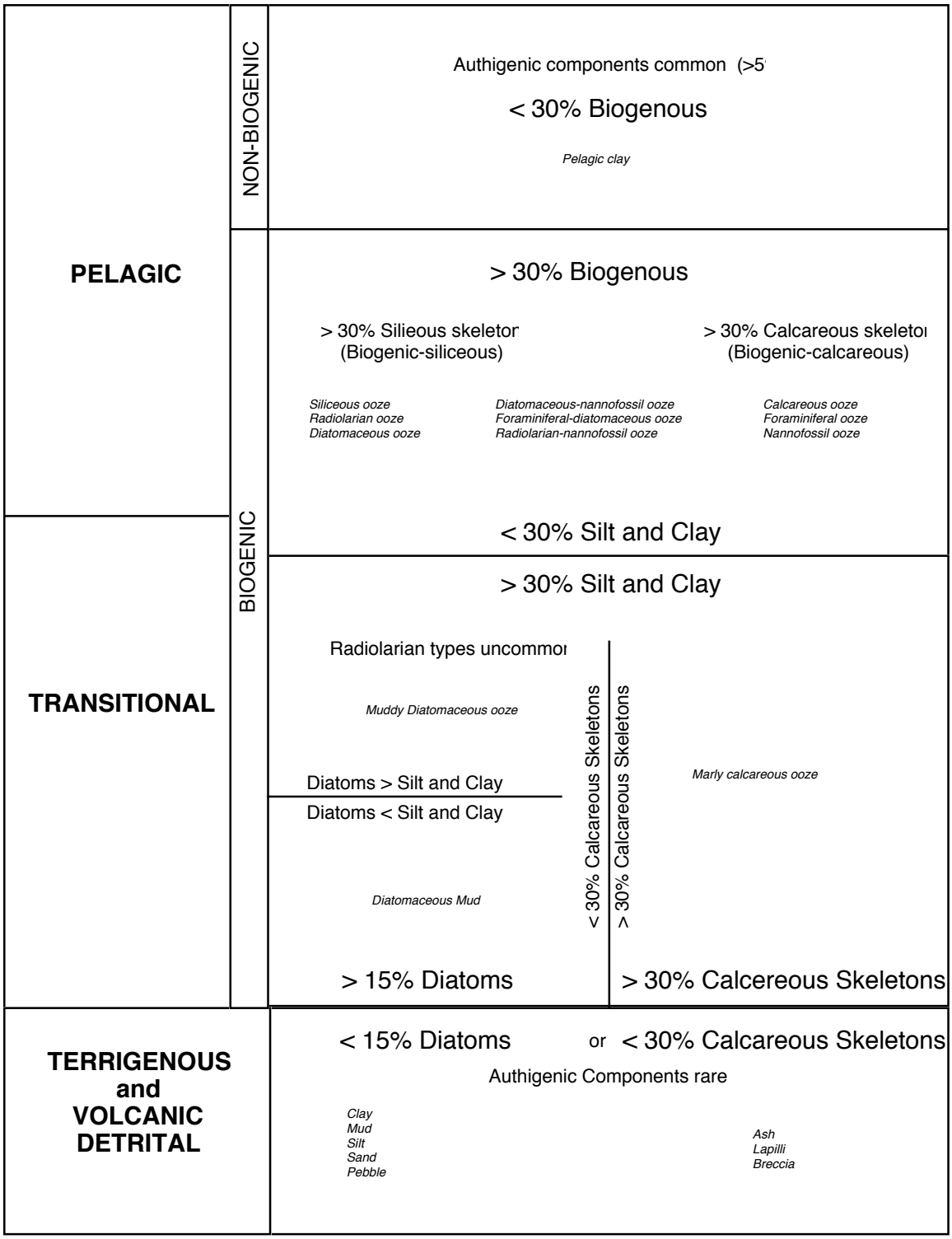
Volcaniclastics

This sediment group is classified according to the classification proposed by Fisher (1961, 1966). The nomenclature and the size limits are as follows:

Fine ash:	less than 63 μm
Coarse ash:	63 μm to 2 mm
Lapilli:	2 mm to 64 mm

As suggested by Fisher (1966), the term "volcanic" is not used as an adjective of ash or lapilli. The term "volcaniclastic" is used only for graded sequences where the particles size grades from ash to lapilli; thus, the name of the unit is graded volcaniclastics. In the case of graded sequences where the size of the particles ranges within one textural class, the unit is named according to its textural class (e.g., "coarse ash, brownish black (5YR 2/1) graded, well sorted").

Volcaniclastics that have biogenic or terrigenous components in excess of 15% will have a qualifier with the term "bearing" added to the qualifier (e.g., "diatom-bearing coarse ash"). The same term is also added to the qualifier of other groups of sediment if the unit contains more than 15% volcaniclastics (e.g., "ash-bearing diatomaceous ooze").


PELAGIC
TRANSITIONAL
TERRIGENOUS and VOLCANIC DETRITAL
NON-BIOGENIC
BIOGENIC
Authigenic components common (>5
< 30% Biogenous
Pelagic clay
> 30% Biogenous
> 30% Silieous skeletor
(Biogenic-siliceous)
> 30% Calcareous skeletor
(Biogenic-calcareous)
Siliceous ooze
Radiolarian ooze
Diatomaceous ooze
Diatomaceous-nannofossil ooze
Foraminiferal-diatomaceous ooze
Radiolarian-nannofossil ooze
Calcareous ooze
Foraminiferal ooze
Nannofossil ooze
< 30% Silt and Clay
> 30% Silt and Clay
Radiolarian types uncommor
Muddy Diatomaceous ooze
Diatoms > Silt and Clay
Diatoms < Silt and Clay
Diatomaceous Mud
< 30% Calcareous Skeletons
> 30% Calcareous Skeletons
Marly calcareous ooze
> 15% Diatoms
> 30% Calcereous Skeletons
< 15% Diatoms
or
< 30% Calcareous Skeletons
Authigenic Components rare
Clay
Mud
Silt
Sand
Pebble
Ash
Lapilli
Breccia