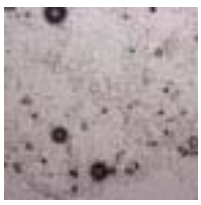
Slide Tutorials

Up until this point, the main focus of the image atlas has been to provide guidelines for identification of individual silt- and clay-sized components in smear slides. The purpose of this tutorial section is to provide some detailed examples to aid in estimating percentages of components, as well as to hone skills in general component identification. Below are a series of images for several end-member examples of terrigenous and volcanogenic sediment types, all of which are included in the shipboard/repository smear-slide reference sets. Each tutorial example is first introduced with a written overview followed by several images/views at different magnifications and/or showing different areas of the slide. These have been annotated for identification of components and to illustrate the process of estimating percentages as described in Mazzullo and Graham (1988; http://www-odp.tamu.edu/publications/tnotes/digital/tnote_08.pdf).

The first step in a smear-slide description is determining the texture of the sediment being observed, namely the proportions of clay-sized (≤4 µm), silt-sized (4- to 63-µm), and sand-sized (63- to 2,000-µm) material. The grain size is determined using a graduated scale eyepiece reticle that has been calibrated with an optical micrometer so that the 4-µm and 63-µm cutoffs for various magnifications, e.g., 10×, 20×, 40×, and 60×, are known. These grain-size estimates are most important for naming terrigenous (e.g., silty clay, sandy silty clay, etc.) and mixed sediments (Mazzullo and Graham (1988), as well as percentages of authigenic phases that may be used as modifiers, for example, zeolitic clay. Percentages can be estimated using comparator charts (e.g., Mazzullo and Graham, 1988).

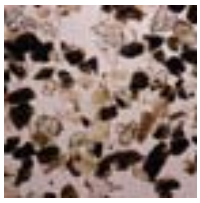
Note that many of the silt/volcanogenic examples in this tutorial are made from the sieved mud (silt and clay) fractions of samples. Removing the sand fraction facilitates identification and percentage estimations of the silt and clay fractions. Coarser sand grains prop up the coverslip to a height that prevents focusing at high magnification on finer surrounding material. A similar effect to sieving can be created by segregating the coarser sand fraction in the sediment slurry to one end of the glass slide with the toothpick. In the finished product, this allows for focusing on fines in the “thin” end, yet maintains a sense of the proportion of coarser material on the “thick” end. Relative percentages have to be adjusted and should be coordinated with the core describers to avoid misnomers in sediments where there is a wide rage of grain sizes.



Volcanic tutorial 1a

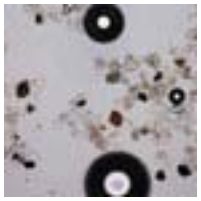
Volcanic tutorial 1b

Volcanic tutorial 1c



Volcanic tutorial 2a

Volcanic tutorial 2b


Silt tutorial 1a


Silt tutorial 1b


Silt tutorial 1c


Mud tutorial 1a

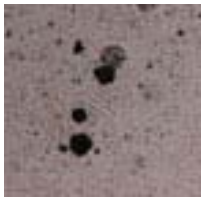

Mud tutorial 1b


Mud tutorial 1c

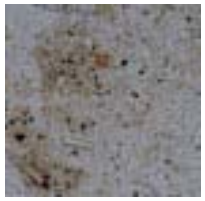

Clay tutorial 1a


Clay tutorial 1b


Clay tutorial 2a


Clay tutorial 2b


Clay tutorial 3a


Clay tutorial 3b