

Microscopy of Sediments deposited in New Orleans by Flood Waters Resulting from Hurricane Katrina

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Hurricane Katrina made landfall on August 29, 2005 as a Category 3 hurricane near Buras, LA [1]. The damage caused by the storm resulted in the eventual flooding of large areas of the city of New Orleans with water from Lake Pontchartrain. Sediment of various thicknesses was deposited throughout the city. After floodwaters had receded, 12 samples of sediment were collected (Figure 1)[2]. In anticipation of significant environmental cleanup efforts, these sediments were characterized using a variety of microscopy techniques. These samples were analyzed using light and electron microscopy to characterize the various particle types present in the sediments.

Initial examination of the samples was performed using low magnification stereobinocular microscopy in order to determine how best to prepare and analyze the samples. Analysis was performed using polarized light microscopy in order to characterize the fine particulate. Automated scanning electron microscopy was used to collect particle size distribution and chemical type data for individual particles of sediment.

Using polarized light microscopy (Figure 2), it was found that the sediment contained several types of particles. All twelve samples were composed primarily (>60%) of various soil minerals (i.e. quartz, feldspar, clays, etc.). Plant material was a major component (>40%) of 10 samples and a minor component (<10%) of the remaining samples. Trace amounts of diatom fragments, sponge spicules, paint particles, insect parts, pollen, fungal spores, glass, asphalt, rubber, and shell fragments were present in some samples.

Automated scanning electron microscopy was used to characterize the composition of the inorganic particles present in the samples. Basic statistical analysis was performed on the data to determine major compositional types and particle size distribution (Figure 3).

Preliminary results indicate that the sediment is primarily composed of soil minerals and plant material. No significant quantities of potentially harmful compounds (i.e. asbestos, lead, etc.) have been observed thus far using these techniques.

[1] R.D. Knabb et al., Tropical Cyclone Report, Hurricane Katrina, National Hurricane Center, (2005)

[2] Samples courtesy Mickey Gunter, Univ. of Idaho.

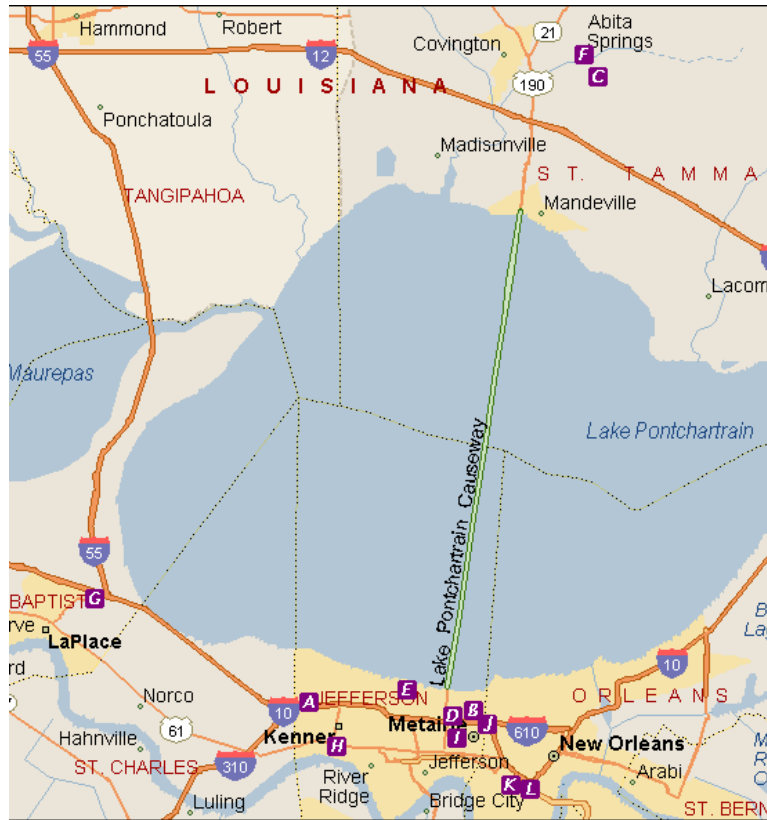


Fig. 1. Map with locations of sample collection.

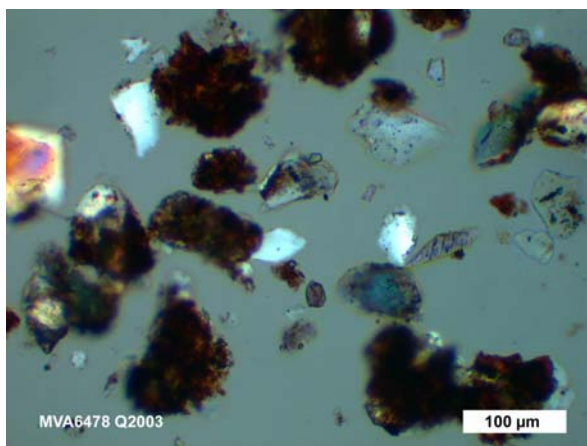


Fig. 2. Polarized light micrograph of sediment particles.

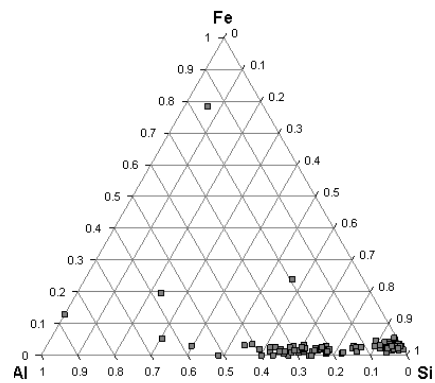


Fig 3. Distribution of particles based on Fe, Al, and Si composition.