Insights into Local Sediment Radionuclide Absorption and Retention in the Island of Puerto Rico

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Abstract: Anthropogenic radionuclides have been introduced to Puerto Rico, a United States (US) Commonwealth, via the marine routes: global atmospheric fallout and local US nuclear power plants. To quantify the regional distribution and behavior of anthropogenic radionuclides in the Caribbean terrestrial system, sediment samples were collected and analyzed. Analysis of radionuclide samples indicated presence of anthropogenic radionuclides in all three locations.

Study Area and Sample Collection

Sediment cores from the Island of Puerto Rico were obtained using a core liner. Sampling took place at: Carolina National Forest, "El Yunque Experimental Station NL #1016-351 - W30°7'46" W 9°31'09.4"

Gamma Analysis

• Samples were analyzed for gamma emitters using a Canberra Geiger-Muller continuous monitor and an automatic gamma counter.

Fractionation of Surface Sediments

Samples were prepared for gamma-counting analysis following Alexander et al. (1997). Sediment filters were prepared for gamma-counting analysis following Alexander et al. (1997). Sediment filters were prepared for gamma-counting analysis following Alexander et al. (1997). Sediment filters were prepared for gamma-counting analysis following Alexander et al. (1997). Sediment filters were prepared for gamma-counting analysis following Alexander et al. (1997).

Grain Size Analysis

An analysis of sediment particle size was also done using the sediment fractions and population distributions were made. The population distribution of the sediment fractions was made using a 0.3 mm sieve (60% to 100% retention). After sieving the samples, the larger particles were removed and the smaller particles were determined using standard techniques for the determination of the size distribution of the sediment fractions.

Table 1: Sample location, description of habitat conditions and surface Cs-137 activity. Error associated with the 137Cs activities are ± 5.0 %.

Preliminary Conclusions

• Sediment and soil samples indicate the presence of Cs-137 at each study site.

• Highest Cs-137 concentrations were identified at the Caribbean National Forest.

• Grain size analysis indicates clay particle concentrations equal 10% in all samples from all locations.

• Mobile clay content has likely influenced the retention of Cs-137 in the soil samples.

Acknowledgements:

We would like to thank邹 Hong Shi and Yanzhao Gao for their valuable comments on the first draft of this manuscript. This work was supported by the National Science Foundation (NSF) Grant No. OCE-1751957. The contents of this publication do not necessarily reflect the views of the National Science Foundation (NSF).

Selected Literature:


