

PLUTONIUM AS A SOIL EROSION TRACER IN EAST AFRICA

Sophia M. Dowell 1,2, Olivier S. Humphrey 1, William H. Blake 2, Odipo Osano 3, Job Isaboke

3, Andrew L. Marriott 1, Michael J. Watts 1

1. Inorganic Geochemistry, Centre for Environmental Geochemistry, British Geological Survey,

Nottingham, NG12 5GG, UK

2. School of Geography, Earth and Environmental Sciences, University of Plymouth, Plymouth,

Devon, PL4 8AA, UK

3. School of Environmental Sciences, University of Eldoret, Eldoret, Kenya*Corresponding email address

Abstract

Subsistence farmers in Africa are often dependent on food grown within a limited area, and therefore, their health can often be associated with geochemical factors that influence the soil-to-crop transfer of micronutrients (MN) essential for health. Loss of essential MN because of soil erosion can affect both crop yields and the protection of crops against disease, which could dramatically increase the likelihood of food shortages worldwide. In addition to the effects on land, the associated downstream transport of sediments to water bodies associated with soil erosion can impact water security. A large proportion of the degradation caused by soil erosion processes is a direct result of poor land management practises as well as vegetation clearance, and so there is a need for reliable quantitative data detailing rates of soil erosion and sedimentation. This data can then help to reinforce sustainable soil conservation measures in areas where resources to manage soils sustainably can be limited. This research aims to investigate the potential of using plutonium as an alternative tracer of soil erosion in challenging environments such as tropical Africa. This will allow for further research into the extent of soil erosion across East Africa and inform future mitigation efforts to reduce further erosion in the future.