

A study of soil formation rates using ^{10}Be in the wet-dry tropics of northern Australia

R. Lal, L. K. Fifield and S.G. Tims

Department of Nuclear Physics, The Australian National University, ACT 0200, Australia.

A catchment level study to obtain soil formation rates using beryllium-10 (^{10}Be) tracers has been undertaken in the Daly River Basin in the wet-dry tropics of northern Australia. Due to agricultural practices, modern soil loss rates can be significantly higher than long-term soil formation rates, but establishing soil formation rates has proved to be a difficult problem. At long-term equilibrium, however, soil formation from the underlying rock is balanced by soil loss from the surface. This long-term rate at which soil is being lost can be determined using the cosmogenic tracer ^{10}Be , created in spallation of atmospheric nitrogen and oxygen by cosmic rays. Since the annual fallout rate of ^{10}Be is known, the complete ^{10}Be inventory over the depth of the top soil can be used to establish the soil formation rates. Three soil cores have been collected to bedrock, with depths ranging from 1-4 m.

The ^{10}Be isotope is also formed *in situ* in rock outcrops rich in quartz (SiO_2). Since these outcrops are close to the present day surface, they must have been eroding at the same rate as the land surface. Hence, the *in situ* ^{10}Be concentrations provide an alternative measure of the soil formation rates, and a number of samples have been collected over a wide area for this purpose. Results from the work carried out to date will be presented.

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