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

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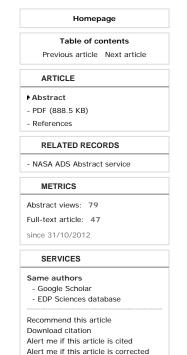
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Abstract

A catchment level study to obtain soil formation rates using beryllium-10 (¹⁰Be) tracers has been undertaken in the Daly River Basin in the wet-dry tropics of northern Australia. Three soil cores have been collected to bedrock, with depths ranging from ~1-3.5 m. 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 ¹⁰Be, created in spallation of atmospheric nitrogen and oxygen by cosmic rays. Since the annual fallout rate of ¹⁰Be is known, the complete ¹⁰Be inventory over the depth of the top soil can be used to establish the soil formation rates.

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