LANDSCAPE TRANSFORMATION DURING THE EARLY TO MID PLEISTOCENE TRANSITION (EMPT) IN HUMID TROPICAL ENVIRONMENTS DEDUCED FROM COSMOGENIC KRYPTON BURIAL AGES AND PREBURIAL EXPOSURE

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Abstract

The Early to Mid-Pleistocene Transition (EMPT) is characterized by a significant shift in glacial-interglacial cycles, and understanding what drove the resultant environmental changes is crucial for comprehending Earth's climatic system. The response at high latitudes is well established. However the effect of the EMPT in tropical regions is largely unresolved, despite its importance for global climate dynamics. We have used 78Kr and 81Kr concentrations in individual detrital zircon pebbles from a range of gem-placer deposits in the humid-tropical areas of Sri Lanka in order to establish a record of past surface stability and activity. The majority of zircons record burial coinciding with the EMPT and the first succeeding glacial cycles. Most samples record pre-burial exposure durations of between 1 and 10 million years. Pre-burial denudation rates are much lower than late Quaternary denudation rates determined for humid tropical Sri Lanka. The results point to a fundamental modification of a previously stable, ancient landscape during the EMPT. We discuss the applicability of our approach to infer changes in erosion and weathering in the humid tropical areas elsewhere, and the role of tropical weathering as feedback mechanism in episodes of profound climatic change.

Keywords: Krypton, 81Kr, EMPT

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