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Annual ^{10}Be record in travertine covering 1510-1701: a new proxy for reconstructing annual solar activity

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Previous research has revealed that the ^{10}Be record in laminated travertine has significant potential for reconstructing past high-resolution solar activity. However, the depositional processes of atmospheric ^{10}Be into travertine have not been entirely resolved, therefore the methodology for extracting the production signal is not well established. In this study, we present an annually resolved ^{10}Be record from Baishuitai travertine covering 1510-1701 CE, along with environmental proxies, discuss the potential influence of climatic/environmental variations on the travertine ^{10}Be record, and propose an improved correction methodology for extracting the atmospheric ^{10}Be production signal from the travertine. We show that ^{10}Be deposition in travertines has two environmental impacts: the transport efficiency of atmospheric ^{10}Be into travertine and the additional ^{10}Be inflow from overland flow caused by rainfall. We demonstrate that these effects can be corrected based on iron and potassium contents, and the resulting corrected record reasonably agrees with ice-core and tree-ring data, indicating that ^{10}Be in travertine can be a good proxy for probing the past annual solar activity.

Student Submission

No

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