

Regionally-extensive ejecta layer of the Australian tektite strewn-field: the MIS 20 large meteorite impact in Indochina

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For more than 50 years aspects of the Quaternary sedimentary geology of South-East Asia have proven problematic in terms of interpretation as to the origins and relationships of the surface sediment layers. The MIS 20 large meteorite impact (c. 750 to 800ka BP) occurred within Indochina, as is evident from the well-researched ‘Australian Strewn Tektite Field’ which extends over one tenth of the surface of the Earth. Key questions include; 1) whether the sedimentary impact signature is preserved in the region; and 2), whether stratigraphic indicators and dating methods can discriminate meteorite-impact related associations of strata. The importance of the questions raised relate to the search for the impact site, which has not been located conclusively. Moreover, the sedimentary signatures of meteorite impacts are not well-known and the descriptions in this study should aid the recognition of impact signatures elsewhere in the world. An hypothesis was developed: “Characteristics of the surface sediments across a wide area of Indochina represent the effects of a regionally-extensive meteorite impact” . Over one hundred sedimentary sections were logged across five countries in Indochina. A range of methods was used to define the stratigraphy and sedimentology, including CT and X-ray scanning, geochemistry, magnetic susceptibility and environmental luminescence as well as conventional grainsize analyses. Luminescence dating was used to date key strata. The results of the investigation explain the nature of the stratigraphy and relate it specifically to the MIS 20 meteorite impact. In this manner, the strata and sedimentary signatures of a large cosmic impactor are defined across a broad region, rather than being described at singular and isolated sections. The novelty is the spatial scale of the investigation which nevertheless remains detailed. The significance is that a summary model of impact stratigraphy is presented for the region. Moreover, the model may well be applicable outside of Indochina, wherever other large impactors are suspected to have occurred.

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