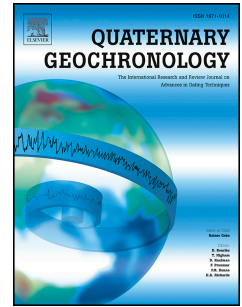


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Resolving problematic luminescence chronologies for carbonate- and evaporite-rich sediments spanning multiple humid periods in the Jubbah basin, Saudi Arabia

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1 Resolving problematic luminescence chronologies for carbonate- and evaporite-rich sediments spanning
2 multiple humid periods in the Jubbah Basin, Saudi Arabia

3

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16

17 **Abstract**

18 Most of the world's presently hyper-arid desert regions have experienced previous periods of
19 significantly higher humidity and milder environmental conditions. The timing of these 'greening events'
20 is critical to research upon global climatic fluctuations and for studies of hominin palaeodemography
21 and range expansion, contraction, and extinction, but dating these climatic shifts via terrestrial
22 sedimentary records can be difficult. Here, we outline the challenges inherent in the radiometric dating
23 of carbonate- and evaporite-rich sediments preserved in the Jubbah basin (Nefud Desert, northern Saudi
24 Arabia), a critical area for reconstructing the evolution of local hydrological regimes across long
25 timescales. The Jubbah basin is surrounded by sandstone jebels (bedrock outcrops), which have
26 prevented significant leeward dune accumulation for at least 400,000 years. The sedimentary
27 sequences in the basin indicate repeated fluctuations between arid and humid climatic conditions, and
28 provide key hydroclimatic records for northern Arabia. Quartz OSL and feldspar pIRIR₂₉₀ luminescence
29 measurements and radiocarbon dating efforts are reported from four palaeoenvironmental sections in
30 the Jubbah basin. Dates from sand-rich levels are relatively unproblematic, but significant difficulties

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