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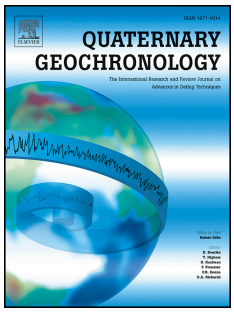

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Resolving problematic luminescence chronologies for carbonate- and evaporite-rich sediments spanning multiple humid periods in the Jubbah Basin, Saudi Arabia

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Abstract

Most of the world's presently hyper-arid desert regions have experienced previous periods of significantly higher humidity and milder environmental conditions. The timing of these 'greening events' is critical to research upon global climatic fluctuations and for studies of hominin palaeodemography and range expansion, contraction, and extinction, but dating these climatic shifts via terrestrial sedimentary records can be difficult. Here, we outline the challenges inherent in the radiometric dating of carbonate- and evaporite-rich sediments preserved in the Jubbah basin (Nefud Desert, northern Saudi Arabia), a critical area for reconstructing the evolution of local hydrological regimes across long timescales. The Jubbah basin is surrounded by sandstone jebels (bedrock outcrops), which have prevented significant leeward dune accumulation for at least 400,000 years. The sedimentary sequences in the basin indicate repeated fluctuations between arid and humid climatic conditions, and provide key hydroclimatic records for northern Arabia. Quartz OSL and feldspar $pIRIR_{290}$ luminescence measurements and radiocarbon dating efforts are reported from four palaeoenvironmental sections in the Jubbah basin. Dates from sand-rich levels are relatively unproblematic, but significant difficulties