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U-series dating of water-table fluctuations in Devils Hole cave (Nevada, USA) over the last 800,000 years

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^{234}U - ^{238}U is a powerful geochronometer that can provide absolute ages of secondary carbonates over a greater interval of time than the well-established ^{230}Th -U. In this study, we apply ^{234}U - ^{238}U dating techniques to subaqueous calcite deposits in Devils Hole cave, located in the Amargosa Desert (Nevada, USA). Subaqueous calcite deposits record paleo water table elevations within the cave. Previous work used ^{230}Th -U dating techniques to reconstruct fluctuations in the local water table over the last 350,000 years (Wendt et al. 2018). We have extended the Devils Hole water table record up to and beyond the ^{230}Th -U dating limit using both ^{230}Th -U and ^{234}U - ^{238}U dating techniques. Precise control ($\pm 60.5\%$) of the initial $^{234}\text{U}/^{238}\text{U}$ ratio is possible due to its low variability and high correlation with $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ (Li et al., 2020). Resulting ^{234}U - ^{238}U age uncertainties are on the order of $\pm 16,000$ years for 800,000-year old calcite. The new ^{234}U - ^{238}U ages allow us to extend the Devils Hole water-table record across the full range of deposition. The resulting 800,000-year record reveals local water-table fluctuated on glacial-interglacial times scales, reaching maximum heights of 20m above modern-day levels. The observed orbital- to millennial-scale fluctuations are interpreted to be primarily driven by climate. Assessing the sensitivity of the Devils Hole water table to various climate modes is key to predicting future water availability in this water-stressed region.

Wendt, K. A., Dublyansky, Y. V., Moseley, G. E., Edwards, R. L., Cheng, H. & Spötl, C., 2018, Moisture availability in the southwest United States over the last three glacial-interglacial cycles *Science Advances*, 4, <https://doi.org/10.1126/sciadv.aau1375>.

Li, X.; Wendt, K. A.; Dublyansky, Y.; Moseley, G. E.; Spötl, C. & Edwards, R. L., 2020 Novel method for determining ^{234}U - ^{238}U ages of Devils Hole 2 cave calcite, *Geochronology*, <https://doi.org/10.5194/gchron-2020-26>