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SISAL: A community-driven initiative to create a global database of speleothem data for model evaluation

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Speleothems can provide extremely high-resolution records of changes in both climate and atmospheric composition. These records have the potential to be used to document regional changes in mean climate and climate variability on annual to centennial timescales. They can also be used to refine our understanding of regional changes in climate forcings, such as dust and volcanic aerosols, through time. Many climate models now explicitly include isotopic tracers, and thus the isotopic records from speleothems can be used directly for model evaluation. There are more than 400 published speleothem records providing information covering part or all of the last 21,000 years and a large number of these records extend much further back in time. Previous attempts to compile speleothem data have not provided a globally-comprehensive synthesis, nor have they provided assessments of measurement, chronological or interpretation uncertainties. SISAL (Speleothem Isotopes Synthesis and AnaLysis) is a new community-based working group sponsored by Past Global Changes (PAGES) to synthesise speleothem data globally and develop a public-access database, that can be used both to explore past climate changes and in model evaluation. SISAL will rigorously evaluate and document the sources of uncertainty in speleothem records to produce standardised and fully-documented reconstructions. The working group will bring together speleothem scientists, speleothem-process modellers, statisticians and climate modellers, to ensure that the database serves the needs of these communities. This presentation will explain the motivation for SISAL, outline the philosophy behind the data synthesis, and present preliminary results from the SISAL working group.