

Influence of micro climatic conditions on salt weathering

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This study evaluated the influence of micro-climatic conditions on rock weathering in the Yoshimi hyaku-ana cave. Air temperature and relative humidity (RH) were measured at hourly intervals. Samples of weathering debris, which had fallen from the cave wall, were collected on a monthly basis and analysed by X-ray Powder Diffraction (XRD) to identify the mineralogy of the salts within the debris. The results showed that, within the range of temperature and relative humidity investigated here, there were significant decreases in air temperature with increasing distance from the cave entrance, but no significant differences in relative humidity between the sites. The amount of salts and debris near the cave entrances was greater than from inner cave wall surfaces, which may be linked to the micro climatic conditions. Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) was the only secondary mineral identified in the fallen debris which may be related to the higher humidity within the cave. Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) also has a very low solubility and is therefore liable to crystallize under a wide range of environmental conditions. The highest rates of salt weathering were observed under the more humid conditions during spring and summer, with lower rates of salt weathering in the drier conditions during autumn and winter.

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