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Salt weathering of Pravčice Rock Arch (Czech Republic)

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Pravčice Rock Arch formed in the Upper Cretaceous quartz sandstone presents the largest rock arch in Europe and an iconic geomorphic feature of the Bohemian Switzerland National Park (Czech Republic). Over last decades systematic geomorphological, engineering-geological and rock weathering studies are conducted in the area that is situated in one of the most polluted European regions. Rock weathering studies focused mainly on the analysis of present salt efflorescence and the interpretation of their sources. The salt crystallization together with freeze-thaw cycling causes rapid degradation of hardened sandstone surfaces. 23 samples (granularly disintegrated rock surfaces, salt efflorescence) were collected in 6 vertical profiles. Their laboratory study (phase analysis by X-ray diffraction, chemical composition by ion-exchange chromatography) proved complex mineral assemblages of neo-formed phases in which gypsum can by accompanied by other sulphates – mostly alums like tschermigite, alunite, alunogen, halotrichite, natroalunite, sodiumalum, potassiumalum, mascagnite, Tutton's salt, alumogenite, kainite, natroalunite but also nitrates (nitrammite, nitratine), and chlorides (hydrophilite). The origin of salts is explained based on the atmospheric pollution data. The prognosis of future development of salt weathering in the region is discussed as well.