



Black crust growth processes and crust-stone interface in relation with subjacent limestone microfacies.

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Black crusts are a major weathering form on building stone surfaces exposed to sulphate pollution. While this pollution decreases notably due to sulfur suppression in fuel, black crusts are still a worrying problem in the conservation of cultural heritage.

Crust-stone interfaces and black crust growth processes were described for three limestones widely used in French or European monuments. These limestones were representative of three very different sedimento-diagenetic facies: crinoïdal limestone "Euville stone", porous oolitic limestone "Savonnières stone" and bioclastic matrix-supported limestone "Courville stone".

Petrophysic properties of these stones were very different. Accurate petrographic observation of gypsum crystallization front using photonic and fluorescence microscopes showed that weathering processes differed depending on sedimento-diagenetic fabrics.

In numerous cases, we noticed that the original limestone surface was found inside the encrustation lower layer and not immediately under the upper dark atmospheric particle enriched layer. This lower layer, partially formed by superficial growth of gypsum but also by limestone recrystallization, may cause some problems during restoration or cleaning works, since total gypsum crust removal could lead to destroying a layer of the original stone with eventual damage to painting or decoration.

Building stone facies displayed very varied weathering behaviour at local scale. Study of weathering form could help identifying building stone facies without the use of

time-consuming and costly sampling and analytical methods.