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Summary Exposure to atmospheric conditions results of deterioration in historic monuments. and their stones. Limestone conservation presents many problems that have to be investigated in detail. In this study, limestone deterioration and development of its conservation treatments were investigated through examination of the statues carved from karstic limestones in Nemrut Dağ Monument. The decay mechanisms that had major roles in their deterioration during two thousand years of exposure to atmospheric conditions and the development of their conservation treatments involved several types of analyses that were carried out in the field and in the laboratory. Exposed surfaces of limestones having karstic veins, interior crack surfaces were examined and compared with relatively undeteriorated interior parts. Similar limestones from the geological formations nearby were artificially deteriorated by salt crystallization and were also examined for comparison. Standard physical and physicomechanical tests, petrographical analysis, XRD, SEM-EDX and FTIR were used during those examinations. Swelling nature of clays in limestones and their control were quantified by CEC measurements. The micro structure of limestone was observed to be composed of micritic calcite with karstic veins of sparitic calcite crystals. Some karstic zones were found to be preferred sites of dissolution and precipitation of calcium carbonate where swelling action of clays and widening of cracks occurred. Iron oxides that moved through those zones, as well as biological activity were also

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