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Analysis of the black crust on Saint Michael's Church

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The goal of the present study is to characterize the black crust on the main stone used at Saint Michael's Church in Cluj-Napoca, Romania.
The gases in the atmosphere, along with natural and artificial pollutants can cause damage the integrity of the stone when it comes in contact with the stone's chemistry.
In order to explain the mechanism of stone decay due to black crust it is necessary to know what "weathering" means, so it must be seen as a complex process that consists of: type of material, the environment in which the material is located, and the amount of time required for the process to take place. Each material has particular properties, due to its composition and genesis. When it comes in contact with the acidity of the "acid rain" (caused by sulphur, nitrogen oxides and carbon dioxide), the rain penetrates into the pore structure, corroding it and "allowing" the atmospheric particles to penetrate the stone.
St. Michael's Church is one of the oldest Gothic architectural monuments in Cluj, Romania, being built predominantly from Cenozoic (Upper Eocene) limestone, locally known as the Cluj Limestone. The main quarry was in Baciu, near Cluj.
The samples that were collected from the Saint Michael's Church were characterized by means of: optical microscope, Scattering Electronic Microscope, thin sections, EDS
The samples that were collected from the Saint Michael's Church went through a series of tests: optical microscope, Scattering Electronic Microscope, thin sections, EDX, and cross-section.
The optical microscope analysis of the thin sections revealed that the black crust layer is approximately 0.01mm, and in the sample there are perfectly shaped ooides, which is characteristic to this type of limestone.
The SEM analysis shows a resedimentation layer on the surface of the black crust, which occurred probably due to the effect of acid rain.
Further information regarding the results of the test will be presented on the poster.