



Dolostones as building materials of the medieval churches of Segovia (Spain): textural features and bioalteration.

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Segovia, declared Patrimony of Mankind by the UNESCO in 1985, has several medieval churches built out of granite, Cretaceous dolostones and limestones. The stone type denoted “Piedra de Sepulveda” or “Rosa Sepulveda” occurs abundantly in these monuments.

In this study, we examined the dolostones of four of Segovia’s most significant churches: San Martin (10th century), San Lorenzo (12th century), San Millán (11th – 12th century) and La Vera Cruz (13th century).

The dolostones show different facies spanning from dolomitized biomicrites of foraminifers and biocalcarenes, to crystalline dolostones and sandy dolostones with medium- to fine-grained euhedral and subhedral dolomite crystals. In general, all the dolostones show intense intercrystalline and intracrystalline porosity.

The churches examined show several features indicating their biodeterioration. Signs were observed of colonization by organisms and microorganisms organized as biofilms that could cause the decay of the monument.

To assess these effects on the dolostones, we used the techniques transmission light microscopy (TLM), scanning electron microscopy with back-scattered electron imaging (SE-BSE), low temperature scanning electron microscopy (LTSEM) and confocal scanning laser microscopy (CSLM).

Our findings indicate that microbial biofilms both extend across the stone surface and

also penetrate the rock. This colonization of dolostone may be conditioned by the different textural features of the rock that affect intercrystalline and intracrystalline penetration. This penetration leads to surface crystalline disgregation. In addition, other factors such as certain sedimentary structures, including geodes, bioturbation channels and vug porosity, promote this colonization of monument stone.