

The influence of marine environment on the conservation state of Built Heritage: An overview study

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Abstract

Marine aerosol is a chemical complex system formed by inorganic salts and organic matter, together with airborne particulate matter from the surrounding environment. The primary particles transported in the marine aerosol can experiment different chemical reactions in the atmosphere, promoting the so-called Secondary Marine Aerosol particles. These kinds of particles (nitrates, sulfates, chlorides etc.), together with the natural crustal or mineral particles and the metallic airborne particulate matter emitted by anthropogenic sources (road traffic, industry, etc.) form clusters which then can be deposited on building materials from a specific construction following dry deposition processes. Apart from that, the acid aerosols (e.g. CO₂, SO₂, NO_X, etc.) present in urban-industrial environments, coming also from anthropogenic sources, can be deposited in the buildings following dry or a wet deposition mechanisms. The interactions of these natural and anthropogenic stressors with building materials can promote different kind of pathologies. In this overview, the negative influence of different marine environments (direct or diffuse influence), with or without the influence of an urban-industrial area (direct or diffuse), on the conservation state of historical constructions including a wide variety of building materials (sandstones, limestones, artificial stones, bricks, plasters, cementitious materials, etc.) is presented.

Keywords: Marine aerosol; Built Heritage; Nitrates; Sulfates; Chlorides; Efflorescence