The impact of air pollution on the rate of degradation of the fortress of Florianópolis Island, Brazil

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Abstract

The study of the prevalence of agglomerated nanoparticles (ANPs) containing potentially hazardous elements (PHEs) in the atmosphere is an emerging field of research. As such, the development of effective analytical procedures for the documentation of ANPs in air dust is vital for the evaluation of human health consequences. X-ray powder diffraction (XRD), Raman spectroscopy (RS), Mossbauer spectroscopy (MS) and advanced microscopy (AM) analyses of levels of pollutant concentration have been completed for many years in buildings worldwide. The chemical and mineralogical features of the Fortress of Nossa Senhora da Conceição de Araçatuba in the Brazilian state of Santa Catarina were utilized to catalog the geologic makeup of the structure's raw materials. Analyses of diverse categories of historical building were developed and performed to show the incidence of normal and anthropogenic compounds with PHEs. These geochemical effects and the subsequent fate and transport of nanoparticulate and colloidal (1–1000 nm) compounds in the atmosphere have remained a focus of study for many years. However, the data published in the scientific literature is nowhere near adequate to generate an exhaustive standard of the performance, fate, and transport of natural and anthropogenic ANPs in the atmosphere. Studies to date do provide a preliminary argument for the human health risk calculations from historical buildings due to ANPs. Thus, the geochemical makeup of ANPs and their position in collected nanomineral–organic accumulations may offer some insight into their source. Our ability to detect such ANPs may decrease over time due to the tendency of historical buildings to accrete sludge over the years. The occurrence of PHEs in atmospheric ANPs has not formerly been recognized on the island environment examined in this study. However, it has been shown that it presents a clear and present danger to the preservation of historical monuments.

Keywords

Pollution; Historical construction; Defence buildings; Degradation