

# Urban Weathering: Interactive Rendering of Polluted Cities

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Weathering effects are ubiquitous phenomena in cities. Buildings age and deteriorate over time as they interact with the environment. Pollution accumulating on facades is a particularly visible consequence of this. Even though relevant work has been done to produce impressive images of virtual urban environments including weathering effects, so far, no technique using a global approach has been proposed to deal with weathering effects. Here, we propose a technique based on a fast physically-inspired approach, that focuses on modeling the changes in appearance due to pollution soiling on an urban scale. We consider pollution

effects to depend on three main factors: wind, rain and sun exposure, and we take into account three intervening steps: deposition, reaction and washing. Using a low-cost pre-computation, we evaluate the pollution distribution throughout the city. Based on this and the use of screen-space operators, our method results in an efficient approach able to generate realistic images of urban scenes by combining the intervening factors at interactive rates. In addition, the pre-computation demands a reduced amount of memory to store the resulting pollution map and, as it is independent from scene complexity, it can suit large and complex models by adapting the map resolution.