Building collapse and density current in volcanology via engineering

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This paper explores the behavior of skyscrapers collapse that, on impact of the fragmented material with the ground, generates shear density currents. These currents resemble some volcanic flow, e.g. the one generated during the May 18, 1980 explosive eruption of Mount St. Helens (MSH), when, after a sector of the volcano collapsed, a highly mobile, multiphase turbulent current formed and interacted with the surrounding landscape. In order to investigate on the similarity between these two events, computational fluid dynamic is employed to simulate the propagation of the dusty currents that were generated by the World Trade Center (WTC) collapse over Manhattan, since the size and multiphase behavior were similar to those of MSH. Results reveal that the flow dynamic pressure strongly increases because of flow-building interaction, and the surrounding buildings make the urban setting an area of exponential decay of the deposits. These results can be of help for understanding the hazard of explosive eruptions over complex urban settings.