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Flushing of a buoyant pollutant from an urban canyon NIGEL KAYE, Clemson University, GARY HUNT, KONSTANTINOS SYRIOS, Imperial College London — We examine the wind driven flushing of a negatively buoyant pollutant from an urban canyon. We examine the rate at which a fluid of buoyancy g' is removed from a two dimensional urban canyon of width W formed by two buildings of height H and square cross section. The flushing is driven by a wind flow, of mean velocity U, normal to the axis of the canyon. A previous study of flushing of a neutrally buoyant fluid by Caton *et al.* (2003) showed that the mean concentration decayed exponentially with time indicating a steady exchange of fluid between the canyon and the flow above and a uniformly well mixed canyon. However, for the case of a negatively buoyant pollutant, the fluid buoyancy will tend to suppress fluid exchange as additional work is required to lift the dense fluid up and out of the canyon. One would therefore expect that the flushing rate would be a function of the Froude number $Fr = U/\sqrt{g'H}$ as well as the aspect ratio of the canyon H/W. In our experiments the canyon does not remain well mixed, but rather the buoyant fluid is skimmed off the top and the pollutant is etched away over time. We present experimental results for $H/W = 0.5$ and 1 and $0.4 < Fr < 2.4$ that show the flushing rate increasing with increasing Froude number, as expected. Caton, F.; Britter, R. E. & Dalziel, S. B. Dispersion mechanisms in a street canyon, Atmospheric Environment, 2003, 37, 693-702

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