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A simple stochastic quadrant model for the transport and deposition of particles in turbulent boundary layers MICHAEL REEKS, University of Newcastle UK, CHUNYU JIN, Nottingam University UK, IAN POTTS, University of Newcastle UK — We present a simple stochastic quadrant model for calculating the transport and deposition of heavy particles in a fully developed turbulent boundary layer based on the statistics of wall-normal fluid velocity fluctuations obtained from a fully developed channel flow. Individual particles are tracked through the boundary layer via their interactions with a succession of random eddies found in each of the quadrants of the fluid Reynolds shear stress domain in a homogeneous Markov chain process. Deposition rates for a range of heavy particles predicted by the model compare well with benchmark experimental measurements. In addition deposition rates are compared with those obtained continuous random walk (CRW) models including those based on the Langevin equation for the turbulent fluctuations. In addition, various statistics related to the particle near wall behavior are also presented.

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