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Numerical prediction of pollutant dispersion and transport in an atmospheric boundary layer STÉPHANIE ZEOLI, LAURENT BRICTEUX, University of Mons (UMONS) Belgium, MECH. ENG. DPT. TEAM — The ability to accurately predict concentration levels of air pollutant released from point sources is required in order to determine their environmental impact. A wall modeled large-eddy simulation (WMLES) of the ABL is performed using the OpenFoam based solver SOWFA (Churchfield and Lee, NREL). It uses Boussinesq approximation for buoyancy effects and takes into account Coriolis forces. A synthetic eddy method is proposed to properly model turbulence inlet velocity boundary conditions. This method will be compared with the standard pressure gradient forcing. WMLES are usually performed using a standard Smagorinsky model or its dynamic version. It is proposed here to investigate a subgrid scale (SGS) model with a better spectral behavior. To this end, a regularized variational multiscale (RVMs) model (Jeanmart and Winckelmans, 2007) is implemented together with standard wall function in order to preserve the dynamics of the large scales within the Ekman layer. The influence of the improved SGS model on the wind simulation and scalar transport will be discussed based on turbulence diagnostics.

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