THREAT AGENT DEFEAT MODELING AND TESTING USING WMD SIMULANTS

Steps After Jack Rabbit Ii Chlorine Field Experiment To Calibrate And Post-process Concentration And Meteorological Observations Provided By DPG

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The Jack Rabbit II field experiments in 2015 and 2016, supported primarily by DTRA and DHS/CSAC, provided unique detailed observations of emissions and subsequent downwind dispersion of releases of pressurized liquefied chlorine from a ten-ton tank. No field tests involving chlorine releases of this magnitude (equivalent to the amount carried in a road tanker) had been carried out previously. These observations, comprising nine separate trials, were subsequently used for extensive scientific analysis and model evaluations described in 20 peer-reviewed articles published in 2020-2022 in the journal, Atmospheric Environment. The current paper describes some of the procedures used to analyze the concentrations and meteorological variables produced by the field experiment team, and produce a final data set for further use. For example, chlorine concentrations were observed using dozens of high-resolution (2 or 3 s) devices from four manufacturers, with the PID devices having the highest number. Although the PID manufacturer suggested a minimum detection limit, uncertainty, and saturation point, it was found that these characteristics often varied from one sampler to the next. So, calibration data from each sampler were used to determine whether the observations from that sampler that day were within acceptable ranges and could be used for model development and evaluation. Similarly, there were dozens of 2-m meteorological towers with aerovanes (PWIDS) set out on the sampling domain. In addition, there were sonic anemometers at five levels on three 32 m towers set up 1 km apart, as well as a surface energy balance station (also with sonic anemometer). Plus, there were multiple vertical profiles taken by radiosonde and minisodar. All these meteorological data were carefully analyzed and then used to prescribe representative surface and upper air meteorological conditions. A few examples of these procedures are given in this presentation. The resulting final data base is available on a public data archive.