Dense Gas Release during Jack Rabbit II Field Experiment

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Context

- Chlorine Transport: toxic chemical agent for the population
- Jack Rabbit II Field Experiment in Dugway Proving Ground (Utah, USA)
- 10 tons of pressurized chlorine blown within an elapsed time of 20 sec for the flash and 90 sec for the pool

Models and HPC Resource

- ATRCOD was used to compute chlorine source term release:
  - Flashing gas chlorine impinging jet: 30m/s
  - Boiling pool of chlorine
- Code_Saturne® V4 was used to perform the wind field and the dispersion
- P-SWIFT was used as the initialization of Code_Saturne®
- The simulations were performed at the CCR T thanks to CEA-DAM:
  - the structured mesh contains 5M cells
  - 1m³0s physical time simulated within 64 cores
- ParaView V4.0 was used to display the pictures

Wind Field Results

- Horizontal slice of wind field at z=1 m
- Zoom on the horizontal slice of wind field at z=1 m
- Sagittal slice of wind field at z=0 m

Boundary conditions

- Inlet at South, East, West and Top boundary faces
- A free outlet at the North faces
- Rough wall at ground and buildings boundary faces

Numerical parameters

- k-ε model was used as turbulent closure
- Time step: 0.05 s
- Upwind scheme for scalar transport

Dispersion Results

Evolution of vertical and horizontal slices of chlorine concentration

Evolution of isovolume chlorine concentration

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References