

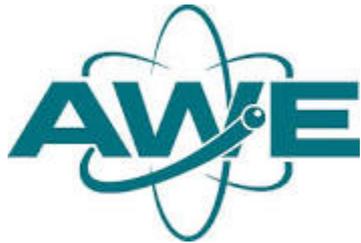
Atmospheric Dispersion Modelling
Liaison Committee (ADMLC)

Use of dispersion modelling for sensor network design to facilitate source attribution, emissions estimation and incident response

ADMLC Webinar, 14:00-16:30 GMT, Tuesday 8 February 2022



ADMLC Membership



UK Health
Security
Agency





ADMLC Recent News

- **July 2021:** Report published on “Dense-gas dispersion for industrial regulation and emergency response” by Rachel Batt (HSE)

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Incidents

	A	B	C	D	E	F	G	H	I
1									
2	Case	Substance	Flammable	Toxic/health	Industrial	Off site	Rural	Railcar	Road tank
3	UK								
4	Flixborough	Cyclohexane	•		•				
5	Wealdstone	propane	•		•	•			
6	Ellesmere port	Ethyl chloride, hydrogen chloride		•	•				
7	Runcorn	Vinyl Chloride	•	•		•			
8	Buncefield	Gasoline	•		•				
9									
10	Worldwide								
11	Ypres, Belgium	Chlorine		•		•	•		
12	Brooklyn	Chlorine		•		•			•
13	Manhattan	Uranium hexafluoride/Hydrofluoric acid	•		•				
14	Cleveland, Ohio	LNG			•				
15	Poza Rica, Mexico	Hydrogen Sulphide		•	•				
16	Menzengraben	Carbon dioxide		•	•		•		
17	La Barre, Louisiana	Chlorine			•			•	
18	Feyzin, France	Propane	•		•				
19	Glendora, Mississippi	Vinyl Chloride		•	•			•	
20	Blair, Nebraska	Ammonia		•	•				
21	Port Hudson, Missouri	Propane	•		•		•		
22	Potchefstroom, South Africa	Ammonia		•	•				•
23	McPherson, Kansas	Ammonia		•	•				
24	Chicago, Illinois	Silicon tetrachloride (hydrogen chloride g	•		•				
25	Mill Woods, Canada	Liquid Propane, Butane & cc	•		•				
26	Baton Rouge 1976	Chlorine		•	•				
27	Houston, Texas	Ammonia		•	•				•
28	Seveso, Italy	2,3,7,8-Tetrachlorodibenzo-p-dioxin ("TCDF")	•		•				
29	Chicago, Illinois 1978	Hydrogen sulfide		•					
30	Youngstown, Florida	Chlorine		•	•			•	
31	Mississauga, Ontario	Chlorine and other chemica	•		•				
32	Montana, Mexico	Chlorine		•	•			•	
33	Geneva, Switzerland	Bromine		•	•				
34	Mexico City, Mexico	LPG	•		•				
35	Bhopal, India	Methyl Isocyanate		•	•				
36	Naples	Gasoline	•		•				
37	Lake Nyos, Cameroon	Carbon dioxide		•		•	•		
38	Lake Monoun, Cameroon	Carbon dioxide		•		•	•		

Experiments

	A	B	C	D	E	F	G	H	I	J
1										
2		Substance	Flammable	Toxic	Field	Wind tunnel	Both	Land	Water	Inst
3	AGA	LNG	•		•			•		•
4	API/Esso	LNG	•						•	
5	Atkinson and Cold	Hexane, water, dec	•		•			•		
6	Avocet	LNG	•		•					
7	BA Hamburg	SF6				•		•		•
8	BA TNO	SF6				•		•		•
9	BMT	Argon/Freon				•		•		
10	Bureau of Mines	LNG	•		•				•	
11	Burro	LNG	•		•			•	•	
12	CHRC	CO2				•		•		
13	China Lake	Argon, Freon-12				•				
14	COOLTRANS	CO2		•	•			•		
15	Coyote	LNG	•		•			•	•	
16	Desert Tortoise	Ammonia	•	•	•			•		
17	Eagle	Nitrogen Tetroxide	•	•	•			•		
18	Ecole des Mines d	Ammonia	•	•	•			•		
19	Egami et al	CO2		•	•			•		
20	EMU-ENFLO	Krypton				•		•		
21	ENFLO 2000	CO2, krypton				•		•		
22	Enflo 2001	3% propane in CO2				•		•		
23	Falcon	LNG	•		•			•	•	
24	FLADIS	Ammonia	•	•	•			•		
25	FLIE	LPG	•		•			•		
26	Gadila	LNG	•		•			•	•	
27	Goldfish	HF		•	•			•		
28	GRADE	LPG			•					•
29	Guldemonnd	Argon				•		•		
30	Hall and co-work	BCF, argon				•		•		•
31	Hoot et al	Freon/air mix				•		•		
32	HSE 1985	CO2			•			•		
33	HSE 2012	LH2	•		•			•		
34	ICHMAP	HF		•	•	•		•		
35	Imperial Chemical	Ammonia	•	•	•			•		•
36	INERIS	Ammonia	•	•	•			•		
37	Jack Rabbit I	Chlorine, ammonia	•	•	•			•		
38	Jack Rabbit II	Chlorine		•	•			•		



ADMLC Recent News

- September 2021:** Report published on “A Review of Approaches to Dispersion Modelling of Odour Emissions and Intercomparison of Models and Odour Nuisance Assessment Criteria” by CERC and ELLE

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ADMLC Recent News

- **September 2021:** CERC-HSA commissioned to undertake new project on: “Investigating the impact of applying different grid resolutions of NWP met data in atmospheric dispersion modelling”
- Scope:
 - Review of NWP models
 - Comparison of model endpoints for NWP datasets
 - Comparison studies for regulatory atmospheric dispersion modelling
 - Potential for double counting of the impact of terrain
 - Use of NWP met data for probabilistic accident consequence assessments
- Completion date: December 2022.



ADMLC Projects

Possible future ADMLC research projects (www.admlc.com/work):

1. Application of models to the design of monitoring networks
2. A review of model evaluation procedures
3. Dry/wet deposition of gases and particulates
4. Modelling of sources in an emergency
5. Fire source terms and plume rise
6. Understanding the impact of meteorological uncertainties

HARMO19

conference paper
discusses these topics

ADMLC is seeking to partner with other funding agencies or self-funding research organisations on topics of mutual interest



Webinar Programme

Aims and motivation:

- To review use of dispersion modelling for sensor network design (for source attribution, emissions estimation and incident response)
- Types of applications:
 1. Safety and defence: discrete short-term releases, acute human exposures (e.g. chemical accidents, fires)
 2. Environmental: more continuous releases, chronic/cumulative exposure of ecosystems and people (e.g. intensive agriculture)
- Discuss and share information, knowledge and experience across these different types of application at different scales
- To identify challenges and opportunities, and to see if learning from one area can benefit another



Webinar Programme

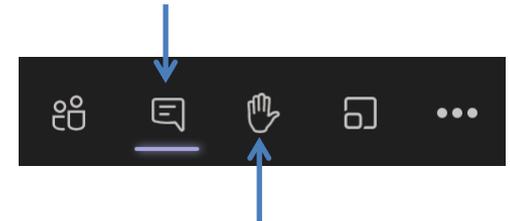
14:00 – 14:10	Simon Gant (HSE, ADMLC Chair): Introduction
14:10 – 14:30	Veronica Bowman (DSTL): “Dispersion modelling for sensor network design and inverse modelling”
14:30 – 14:50	Matthew Goodwin (AWE): “Applications of atmospheric transport and dispersion modelling for nuclear test monitoring”
14:50 – 15:10	Hannibal Fossum (FFI): “Quick and accurate dispersion modeling based on precomputed wind fields”
15:10 – 15:20	BREAK
15:20 – 15:40	Paul Westoby (DSTL): “Optimisation of CB Sensing”
15:40 – 16:00	Benjamin Truchot (INERIS): “Optimization of sensor locations using dispersion modelling for application to industrial facilities”
16:00 – 16:30	DISCUSSION



Webinar Programme

Webinar is being recorded on video
Slides and video will be made available on the ADMMLC website

- Please mute your microphone if you're not speaking
- Please add any comments/questions for the discussion session in the **chat window**
- Please **raise your hand** if you would like to speak in the discussion session





Thank you

Thanks to all our presenters and the ADMLC Secretariat for organising this webinar

- Justin Smith and Peter Bedwell (PHE)

We would welcome feedback: admlc@phe.gov.uk

- What worked well?
- What could we improve?
- Breakout networking sessions during the coffee break?
- Future ideas for ADMLC seminars?