



# **FAIRMODE – CT4 MICRO-SCALE AQ MODELLING - The UOWM approach**

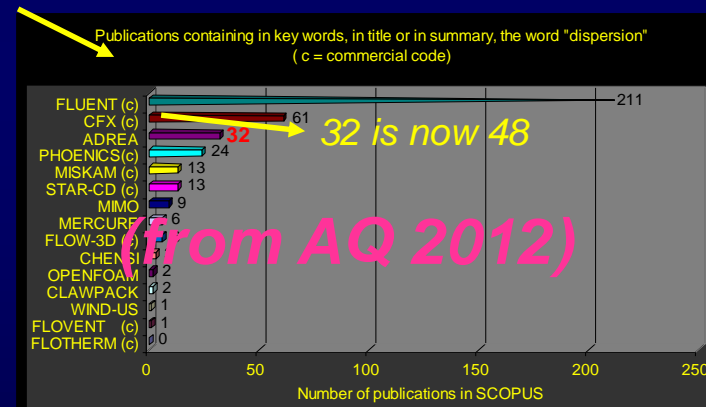
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# ADREA-HF CFD CODE

## Constantly developing

- Robust, powerful and general
- Geometry representation with use of porosities
- Specialization in environmental applications
- Latest additions:
  - Large Eddy Simulation
  - Efficient parallel solver
  - Arbitrary number of species
  - Combustion
  - Eulerian and Lagrangian Dispersion
  - Back tracking (find source location and strength)
  - GUI pre and post processor (called EDes)



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## ADREA HF model set –up ( I)

Modelling domain : size ~km, spatial resolution ~ meters

Input data

- Emissions : any time/space variability (including very short/instantaneous releases)
- Meteorology : 1-D vertical profiles for wind, temperature and humidity .
  - inherently atmospheric stability treatment
  - nesting capabilities : not yet

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## ADREA HF model set –up (II)

### Main modeling approaches

- LES ( inflow bc : periodic, langevin type)
- RANS (concentration and/or dosage: mean and std)
- Langrangian dispersion option

Steady/unsteady simulations : time range : hour to day

### ADDITIONAL NOVEL MODELING TOOLS

- weather clustering
- exposure uncertainty quantification
- pollutant annual statistics

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## ADREA HF model set –up (III)

### Pollutant characteristics

- Pollutant concentrations and dosages : mean, std, pdf/cdf
- radiological option
- passive and/or buoyant
- chemical pollutants phase change (i.e. liquid/gas)

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# Simulation for annual statistics

- Restricted to passive pollutants
- Emission normalized concentrations
- Annual concentration indicators via
  - steady state simulation per hour : random hour selection (100-500 simulations per year)
  - simulation per day : weather clustering and representative days ( minimum 8 to 10 simulation days)

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# ADREA-HF model evaluation

- Comparisons with experiments
- Statistical indicators
- Evaluation exercises
  - Several evaluation exercises
  - Passive pollutant dispersion in wind tunnel and field experiments
  - heavy gas dispersion field experiments
  - Hydrogen dispersion laboratory experiments





ARISTOTELES

**Ευχαριστώ**  
**Thank you**

FAIRMODE technical meeting , Oslo, Sept 30-  
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