
# CALPUFF and ODORS Training Course Brochure

**October 22-25, 2013, MSL Formación, Marques de Ahumada Street 5, Madrid, Spain**

Course material includes: Course slides notebook, training exercise notebooks, course DVD with case studies, datasets, CALApps GUI and reference documents.

Course will be held from 8:30 a.m. to 5:30 p.m. each day.

Computers will be provided for the hands-on work (1-2 students per computer).

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For any doubt, suggestion or issue, please contact us here:

Carlos N. Diaz

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Credit card payments should be made through the online platform in the following web address:

https://olores.stagehq.com/events/2496/booking/new

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## Terms:

**Course Fee:** 990€ (VAT not included*) (late registration available at a cost of 1090€)

**Last date for early registration:** 15th October 2013.

**Last date for late registration:** 21st October 2013.

Olores.org reserves the right to cancel the course in which case fees will be fully refunded.

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Credit card payments can be sent via email to Carlos Diaz (carlosdiaz@olores.org). If you have any question, please contact Carlos Diaz.

The course will be held at the training institute, MSL Formacion, Madrid, Spain:

**MSL Formación**

Marques de Ahumada Street 5

Madrid, 28028 Spain

* Cost of the course is 990 € (VAT excluded). VAT in Spain is 21%. For european participants with a valid VAT number, no VAT is charged. For participants outside Europe no VAT is charged either.

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**October 22-25, 2013,** Marqués de Ahumada St, 5, **Madrid, Spain**

| **Name** | |
|---|---|
| Affiliation | |
| Address | |
| City | |
| Country | Zip (Postal) Code |
| Telephone | Fax |
| E-mail Address | |

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# CALPUFF Modeling Course Outline

Madrid, Spain
October 22-24, 2013

Instructor: Joseph Scire

## Tuesday, October 22 – Day 1: Morning

### 1. OVERVIEW (8:30 a.m. – 12:30 p.m.)

1.0 Introduction
1.1 Background
    1.1.1 Puff vs. Plume models
    1.1.2 Comparison with other models
    1.1.3 Regulatory status
    1.1.4 Near-field applications
1.2 CALPUFF modeling system overview
1.3 Major features of the CALPUFF modeling system
    1.3.1 Geophysical and meteorological preprocessors
    1.3.2 Meteorological modeling
    1.3.3 Dispersion modeling
    1.3.4 Postprocessing and display

**BREAK (11:00 a.m. – 11:15 a.m.)**

1.4 Summary of data requirements
    1.4.1 Minimum data requirements
    1.4.2 Advanced data inputs
1.5 Computer requirements
1.6 Typical applications and uses of the model
1.7 Ongoing and future developments
    1.7.1 Technical Advances
    - ISORROPIA (v2.2) chemistry, new gas phase module, secondary organic aerosol (SOA) module, aqueous phase chemistry options
    - CALPUFF nested grid features
    - Treatment of daily snow cover

    1.7.2 Graphical User Interface (GUI) developments
    - Upgrade to a GUI for 64-bit Windows 7
    - CALTools (source contributions, significant contribution analysis)
    - CALPUFF Plot (Google Earth based contour and source plots)
    - Time series plotting tool
    - New postprocessing features for 1-hour USA $SO_2$ and $NO_2$ standards

    1.7.3 Evaluation studies

**LUNCH (12:30 p.m. – 1:30 p.m.)**

# CALPUFF Modeling Course Outline

## Tuesday, October 22 – Day 1: Afternoon

### 2. HANDS-ON COMPUTER EXERCISES (1:30 p.m. – 5:00 p.m.)

2.1 Installation of the software
    2.1.1 On-line datasets and links
2.2 Overview of Graphical User Interfaces (GUIs)
    2.2.1 Menu commands
    2.2.2 Online Help system
    2.2.3 Utilities, AERMOD conversion program
2.3 Test case simulations
    2.3.1 Sample model files and standard model test simulations
    2.3.2 Sydney application using MM5 data in no-observations mode

## Wednesday, October 23 - Day 2 – Morning

### 3. TECHNICAL DESCRIPTION OF CALMET (8:30 a.m. – 11:00 a.m.)

3.1 Wind fields
    3.1.1 Initial guess field
        - Interpolation
        - Vertical extrapolation
        - Bias parameters
        - Use of prognostic wind datasets (WRF, MM5, RUC, NAM-WRF, ETA, RAMS, TAPM)
    3.1.2 Diagnostic wind module (Step 1 adjustments)
        - Initial guess field
        - Kinematic effects
        - Terrain blocking
        - Slope flows
    3.1.3 Objective analysis (Step 2 adjustments)
        - Interpolation
        - Vertical extrapolation
        - Influence parameters
        - Smoothing
        - O'Brien adjustment
        - Divergence minimization
3.2 Boundary layer modules
    3.2.1 Overland boundary layer formulation
    3.2.2 Overwater boundary layer formulation
3.3 Assessment of IWAQM (2010) recommendations
3.4 Surface friction velocity
3.5 Monin-Obukhov length
3.6 Convective velocity scale
3.7 Mixing height
3.8 Stability class
3.9 Precipitation and cloud data

# CALPUFF Modeling Course Outline

## Wednesday, October 23 - Day 2 – Morning (Continued)

**BREAK (11:00 a.m. – 11:15 a.m.)**

### 4. METEOROGICAL AND GEOPHYSICAL PROCESSORS (11:15 a.m. – 12:00 p.m.)

4.1 Terrain and land use processors and data bases (TERREL, CTGPROC, MAKEGEO)
4.2 Upper air processors (READ62)
4.3 Surface meteorological processors (SMERGE)
4.4 Precipitation processors (PMERGE, PXTRACT)
4.5 Overwater data (BUOY program, SEA.DAT files)
4.6 Meteorological data display (PRTMET)
4.7 Prognostic processors (CALWRF, CALMM5, CALRUC, CALRAMS, CALETA, CALTAPM)

**LUNCH (12:00 p.m. – 1:00 p.m.)**

## Wednesday, October 23 - Day 2 – Afternoon

### 5. HANDS-ON COMPUTER EXERCISES (1:00 p.m. – 5:00 p.m.)

(Meteorological and Geophysical Processing)
5.1 Complex terrain application

## Thursday, October 24 – Day 3: Morning

### 6. TECHNICAL DESCRIPTION OF CALPUFF (8:30 a.m. – 11:00 a.m.)

6.1 Solution of puff equations – puffs vs. slugs
6.2 Dispersion coefficients
6.3 Building downwash
6.4 Plume rise
6.5 Overwater and coastal dispersion
6.6 Chemical transformation
- 6.6.1 MESOPUFF II chemistry
- 6.6.2 RIVAD/ARM3 chemistry
- 6.6.3 Chemistry files (CHEM.DAT, OZONE.DAT)
- 6.6.4 $NO_3$ prediction refinement
- 6.6.5 Ambient ratio method for NO2 concentrations from NOx predictions

6.6.6 New chemistry modules in CALPUFF v6.4+
- Updated RIVAD gas phase chemistry of $SO_2$, $NO_x$-$HNO_3$
- Gas-particle equilibrium for $SO_4$, $NO_3$ (ISORROPIA v2.2)
- Aqueous phase chemistry (RADM cloud module in CMAQ (SCICHEM)
- Secondary organic aerosol (SOA) module (based on Caltech SOA routines in CMAQ/MADRID)

6.6.7 Radiological transformation (radioactive pollutants)

6.7 Wet deposition (scavenging coefficient approach)

6.8 Dry deposition

6.9 Complex terrain

6.9.1 ISC-type of terrain adjustments

6.9.2 CTDM-type of terrain adjustments

6.9.3 Integrated terrain adjustment approach

6.9.4 Terrain processors (OPTHILL, CTDMPLUS)

6.10 Visibility

6.10.1 New FLAG(2010) methodology (Method 8)

6.10.2 Alternative techniques

6.11 Emissions data – arbitrarily varying files (points, areas, volumes and lines)

6.12 CALPUFF meteorological data options

6.12.1 CALMET meteorological data (CALMET.DAT) file

6.12.2 AERMOD/AERMET meteorological data option

6.12.3 ISC meteorological data (ISCMET.DAT) file

6.12.4 CTDM meteorological data (SURFACE.DAT, PROFILE.DAT) files

6.12.5 Other options (site-specific turbulence data – PROFILE.DAT)

6.13 Memory management

**BREAK (11:00 a.m. – 11:15 a.m.)**

## 7. POSTPROCESSORS (11:15 a.m. – 12:00 p.m.)

7.1 CALPOST

7.1.1 Method 8 Visibility including automatic access of Class I data

7.2 APPEND

7.3 CALSUM

7.4 POSTUTIL

7.4.1 Ammonia Limiting Method (ALM) options

7.5 CALTools

7.5.1 CALANALYSIS

7.5.2 AER2CAL

7.5.3 Wind Rose Plotter

7.5.4 Time Series Plotter

7.5.5 Back Trajectory Generator

7.5.6 Quantitative Meteorological Evaluation Package

7.5.7 Pollution Rose Plotter

7.5.8 Key Variable Extractor

7.5.9 Quantile-Quantile (Q-Q) Plotter

**LUNCH (12:00 – 1:00 p.m.)**

# Thursday, October 24 – Day 3: Afternoon

## 8. HANDS-ON COMPUTER EXERCISES (1:00 p.m. – 5:00 p.m.)

(CALPUFF Dispersion Modeling and Postprocessing)

8.1 Subhourly (accidental release) application

8.2 Long Range Transport Class I Visibility Analysis and Nitrogen/Sulfur Deposition

# ODORS Course Outline

MSL Formación, Madrid, Spain
October 25, 2013

Instructor: Jenny Barclay

## Friday, October 25 – Day 1: Morning

### ODORS (8:30 a.m. – 10:30 a.m.)

1.1 Odor Properties
1.2 Odors v.s. Criteria Pollutants
1.3 Odor Effects
1.4 Individual Dose-Response Odor Concentration Gradient
1.5 Legislation
    1.5.1 Nuisance Laws vs. Guidelines
    1.5.2 Odor Regulation – Europe, America, Australia
1.6 Odor Assessment
    1.6.1 What Information is Required
    1.6.2 Assessment of; Existing, Modified and Proposed facilities
1.7 Complaint Analysis
    1.7.1 Odor Survey, Odor Diary, Repeat Questioning, Community Meeting

2.1 Odor Sampling
    2.1.1 Sample Collection Method
    2.1.2 Point sources
    2.1.3 Area sources
2.2 Dilution Olfactometry
    2.2.1 Air Flow Measurement and Mixing Devices
    2.2.2 Subject Interface
        2.2.2.1 Flow Rate, Smelling Chambers, Face Velocity
    2.2.3 Presentation Method
    2.2.4. Measuring Odor Concentration

**Morning Break (10:30 a.m. – 10:45 a.m.)**

### ODOR MODELLING (10:45 a.m. – 12:30 p.m.)

3.1 Odor Modeling
    3.1.1 Differences between steady-state and non steady state models
        3.1.1.1 Stagnation and Retention
        3.1.1.2 Treatment of Calms
        3.1.1.3 Causality Effects
        3.1.1.4 Spatial and Temporal Variability
        3.1.1.5 Coastal Effects and Complex Terrain
    3.1.2 Sub-hourly Meteorology
3.2 Odor Modeling – Post Processing
    3.2.1 Adjustments to 1-hr Averaging Period
    3.2.2 Peak-to-mean ratio

3.2.3 Backgrounds
3.2.4 Interpretation of Results
3.2.5 Presentation of Results
3.3 Problems with using AERMOD for Odors

**Lunch (12:30 p.m. – 1:30 p.m.)**

# Friday, October 25 - Day 4: Afternoon

## 4. HANDS-ON ODOR COMPUTER EXERCISES (1:30 p.m. – 5:30 p.m.)

4.1 Perth, Australia, sub-hourly case, calm conditions
4.2 Odor Application, Waste Water Treatment Plant