Lakes Environmental

Training Services

Professional Courses Available Throughout the Year

On-site & customized courses also available. Contact us for more information.

Who Should Attend

- Air quality professionals
- Environmental consultants
- Government agency regulators
- Environmental engineers
- Environmental planners

CALPUFF & AERMOD Courses

- Understand the models for regulatory and research applications.
- Apply what you learn with interactive case studies covering various scenarios & models.
- Answers to all your modeling problems and the resources to solve future issues.

Course Materials & Approach

Courses emphasize formulation and completion of air quality analyses using the refined model options.

Course manuals contain step-by-step instructions for each hands-on activity covered in the course. These manuals are also designed to contain needed background theory for each major processing step. Course CDs contain all input and output files for the in-class exercises, including the instructor solutions.

- Courses are conducted at professional training centers
- One computer per trainee for hand-on-instruction
- The instructors are continuously rated "outstanding" by the course attendees

Included in the Fee

Each course attendee will receive a full license of:

Screen View: Calculates ground-level pollutant concentration estimates for a single source (screening model).

WRPLOT View: Generates wind rose plots for your meteorological data.

Percent View: Generates percentile concentrations for the ISCST3, AERMOD, or ISC-PRIME results and computes rolling averages.

A US $500 Value!

You will also have the opportunity to purchase ISC-AERMOD View or CALPUFF View at a 10% discount.

Course Instructors

Jesse L. Thé, Ph.D. is a mechanical engineer with more than 20 years of experience in computational fluid dynamics, numerical prediction of environmental fluids, and thermal fluid applications. He is a professor at the University of Waterloo and has extensive experience in training. Dr. Thé is the president and founding partner of Lakes Environmental Software.

Roger W. Brode, of MACTEC, is a meteorologist with 26 years of experience in air pollution meteorology and dispersion modeling. Mr. Brode developed the SCREEN model and has been the lead programmer for the ISC2/ISC3 and AERMOD models.

Russell Lee, is a meteorologist with 29 years of experience in air dispersion modeling. Mr. Lee was one of lead developers involved in the evolution of the ISCST model and its associated preprocessors, while a member of the prestigious U.S. EPA Office of Air Quality Planning and Standards (OAQPS).

James O. Paumier, of MACTEC, is a meteorologist with 22 years of experience in the development of meteorological processors for U.S. EPA. Mr. Paumier was the lead programmer for the AERMET meteorological processor and PCRAMMET upgrades.

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CALPUFF Course

Regulation and Guidance Review

- Air quality modeling approaches: Puff vs. Plume, Gaussian model formulation, model design and applicability (ISCST3, AERMOD, CALPUFF and AUSTAL2000)
- Review of guidance documents for air quality standards and modeling requirements including Class 1 Area impact assessments (U.S. EPA, IWAQM, FLAG)

Technical Background & Model Specialties

- CALPUFF fundamentals: puff model theory & formulation
- Atmospheric turbulence and turbulent dispersion mechanisms including, surface friction velocity, Monin-Obukhov and convective velocity scales, stability class theory, mixing height and plume rise fundamentals
- Dispersion calculations and boundary layer modules for overland and overwater growth
- CALPUFF algorithms regarding complex flow analysis and terrain sub-gridding mechanisms
- Building downwash calculation (BPIP and BPIP-PRIME)
- Chemical transformation (MESOPUFF II and RIVAD/ARM3)

Data Acquisition and Processing

- Geophysical and Meteorological data requirements for CALMET processing
- Step-by-step review of pre-processing procedures, including TERREL, CTGCOMP AND CTGPROC, MAKEGEO, METSCAN, SMERGE, PXTRACT, PMERGE, and READ62
- Raw data QA procedures and recommended methods for solving your issues regarding missing data
- Hands-on experience with wind field QA methods in both 2D and 3D

Hands-On Projects - Multiple Scenarios

- CALPUFF-Lite: screening procedures using ISC inputs
- CALPUFF-Full system: refined procedures using CALMET
- Visibility modeling following IWAQM and FLAG procedures
- Coastal-zone analysis using sub-grid calculation tools
- Odor modeling requirements

Optimizing Diagnostic Meteorology

- Diagnostic vs. Prognostic models
- CALMET Initial Guess
  - Data interpolation and vertical extrapolation
  - Prognostic model output (MM4/MM5)
  - Bias parameters
- CALMET - Diagnostic module
  - Kinematic effects
  - Terrain blocking, and
  - Slope flows
- CALMET - Objective analysis
  - Influence parameters R and RMAX
  - Smoothing and O'Brien adjustments
  - Divergence minimization
- Lake/Sea Breeze option for calculating boundary layer growth

AERMOD Course

Physics of Air Dispersion

- Fate and Transport of pollutants
- Lapse Rate, Mixing Height and Plume Rise
- Solar Radiation Considerations
- Particulates and Deposition
- Introduction to Atmospheric Turbulence
- Reynolds's Number & Froude Number
- Eddy Viscosity, Mixing Length & Stability Classes
- Boundary Layers & Monin-Obukhov Lengths
- Wind Profiles

Hands-On Studies

- Exercises are performed throughout to reinforce scientific concepts – putting theory to practice
- RAMMET and AERMET meteorological data preparation
- Downwash analysis using BPIP-PRIME
- AERMOD and ISC case studies with hands-on model comparisons

Meteorological Data

- Understanding meteorological parameters
- RAMMET processing for ISC
- AERMET overview
- Site-specific parameters and on-site data

Building Downwash

- Building impacts on pollutant dispersion
- Cavity analyses
- PRIME algorithms and validations
- Area of Influence definition

Geographical Considerations

- Coordinate systems and datums (local, UTM, etc.)
- GIS, base maps and data layer management
- Albedo, Bowen Ratio, Surface Roughness
- Terrain processing using AERMAP
- Hill height scale and dividing streamline height

Special Topics

- Horizontal sources and rain caps
- Modeling flares and tanks
- Odor modeling
- Block & running averages
- Percentiles
- Coastal and valley effects
- Source groups and variable emissions
- Fencelines (property boundary considerations)

Model Validations

- AERMOD Evaluation – Overview of field verification
- Validation of PRIME integration within AERMOD
- AERMOD, ISC & CTDM Plus field study comparisons

On-Site and Customized Courses Available