

## TAPM V4

### Highlights

- PC-based 3-D prognostic model for air pollution studies.
- Predicts all meteorological parameters – no local data needed.
- Predicts pollution parameters directly on local, city or inter-regional scales.
- Periods from a day to a year or more from 1997 onwards.
- User-friendly GUI for running, and GIS for visualisation of results.
- Advanced scientific basis for all components, verified performance.
- Can provide meteorological files for some other dispersion models (e.g. ISC, AUSPLUME, AERMOD).

### Graphical User Interface

The model is driven by a graphical user interface (GUI) that selects all model input and configuration options (including access to supplied databases of surface information and synoptic analyses). Model output can also be processed through the GUI, including GIS visualisation, extraction of time-series, static 1-D and 2-D plots, and summary statistics, using common packages. See the TAPM User Manual for more information.

### Model Science and Options

#### Meteorology

- 3-D Eulerian grid, nestable
- incompressible and optionally non-hydrostatic
- predicts winds, temperature, pressure, water vapour, cloud water/ice, rain, snow
- prognostic turbulence scheme
- surface scheme for soil, vegetation and urban categories
- cloud microphysics scheme
- radiation scheme
- wind data assimilation option
- user-defined databases option, including for terrain, land use, soil type, synoptic analyses/forecasts
- option to run TAPM nested within CSIRO's Conformal Cubic Atmospheric Model (CCAM-T) for forecasting applications (a separate licence is required for CCAM-T)

#### Air Pollution

- 3-D Eulerian, nestable
- emissions from point, line, area/volume or gridded sources
- tracer mode (up to four tracer groups)
- multiple pollutant mode (PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>x</sub>, NO<sub>2</sub>, O<sub>3</sub>, SO<sub>2</sub>)
- dust module (PM<sub>30</sub>, PM<sub>20</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>)
- Lagrangian particle module (point sources)
- advanced plume rise module
- building wake module (all emission source types)
- photochemistry (generic reaction set)
- aqueous chemistry
- wet and dry deposition
- particle gravitational settling
- optional hourly-varying background concentration

- optional concentration variances
- peak-to-mean ratio parameterisation using concentration mean and variance
- optional 3-D concentration output
- optional offline-pollution mode to allow pollution to be run from saved meteorology, either for all grids (nested) or for only the inner-most grid in several modes
- option to configure and run CSIRO's Chemical Transport Model (CTM) for urban airshed applications that may require more complex chemistry (e.g. LCC or Carbon Bond) (a separate licence is required for the CTM)

For more information, see the TAPM Technical Paper (Part 1: Technical Description).

### Verification

TAPM has been verified for a number of regions in Australia and overseas. CSIRO has verified the model in a number of industrial and urban regions throughout Australia, as well as for Kincaid and Indianapolis (USA) international tracer datasets and several standard annual dispersion datasets. For more information, see the TAPM Technical Paper (Part 2: Summary of some verification studies).

### Training

An introductory TAPM training course is available through the Clean Air Society of Australia & New Zealand (CASANZ). Specialist training can also be arranged by CASANZ or CSIRO.

### Availability and Cost

Companies and individuals may use TAPM under licence to CSIRO. TAPM is provided as executable code, which will run under the Windows operating system, along with default global terrain and land use databases for one region, and two years of synoptic analyses for one region. The price-list is available on the TAPM web page.

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