

**Press release: “IMDIS—A Teaching Tool for Air Pollution Dispersion Modelling” by Professor Romualdo Salcedo**

Teaching Air Pollution Modelling (APM) requires knowledge on possible approaches to APM, grasping the essentials of complex atmospheric phenomena, and last but not least, not discouraging science or engineering students from pursuing further advanced studies on the subject. The teaching methodology has changed in the last few years, mostly due to the availability of dedicated software tools.

The present book provides a tool to a better comprehension of APM with the aid of hands-on user-friendly software, stressing the main advantages (but also disadvantages) of using Gaussian Dispersion. The author believes that the disadvantages of Gaussian modelling are surpassed by the advantages, at least at an entry level to the subject. Throughout the book, the author guides readers through an interactive multisource dispersion estimation tool, helping them to understand how air dispersion models work.

The IMDIS (Interactive Multisource Dispersion) companion software, is a graphical menu-driven computer program provided with the corresponding open free code. Independent modules exist for meteorological data, dispersion sub-models and sources. The book includes a detailed Operating Manual containing the program structure with a user interface guide that includes the fundamentals and examples of APM calculations. Readers can work with these examples to perform their own calculations. Also, the book offers sections on air dispersion model highlights and model evaluation, such as:

- calibration of dispersion models with site observed data and the usefulness of the model for uncorrelated sites,
- comparison with analytical solutions and short-term models (CEMAPS and PTMAX) using examples from the literature,
- extensive comparison with experimental data (five stacks emitting SO<sub>2</sub> from a petrochemical complex; one stack emitting SO<sub>2</sub> and fine particulates from a pulp and paper unit) and long term models (the Texas Climatological Model),
- estimation of maximum concentration and critical conditions through a powerful global non-linear optimizer. This capability derives from the author experience of more than 35 years on numerical optimization that resulted in the development of powerful search algorithms for the global optimum of constrained non-linear continuous (NLP) and mixed integer (MINLP) problems.

The IMDIS model had been published before, but at a simplified level and on a restricted access basis. The main menu linked to all program activities is an attribute that makes program execution easier, even for new users, allowing them to simulate different approaches to the same scenario without the need to re-enter data. The ability to correct wrong choices from the main menu by simply closing the respective window is a very useful feature as well. The IMDIS optimization features allows the model to find globally maximum concentrations under multisource/rose-wind conditions, either from real meteorological data or from potentially worst-case scenarios (critical conditions).

With its comprehensive coverage, “IMDIS—A Teaching Tool for Air Pollution Dispersion Modelling” is recommended for engineers and scientists who need to perform and evaluate environmental impact assessments. The advantages of many examples and systematic instructions shown in the book seems to be very different from traditional books, however it makes it ideal as a textbook for educational applications in the fields of chemical, biological and environmental science and engineering.

**Author:** Romualdo Salcedo, University of Porto

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