fluidyn –PANAIR

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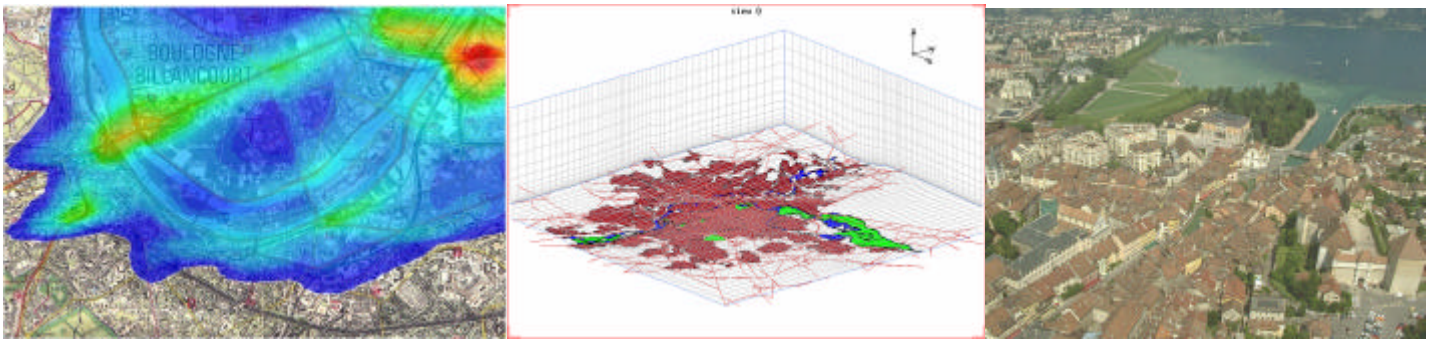
URBAN AIR QUALITY



***fluidyn*-PANAIR** is a module of ***fluidyn*-PANACHE** specially dedicated to environmental impact assessment of urban air quality.

***fluidyn*-PANAIR** is a self-contained fully 3-D fluid dynamics software package designed to simulate pollutant dispersion into the atmosphere. It simulates general air quality in various weather conditions, by taking into account low wind velocities and by including the natural convection in the urban canopy. Designed to be used by highway and environmental engineers, it is used to

- Assess the impact of any changes in the existing infrastructure and to simulate the effects of pollution due to upcoming projects.
- Evaluate the pollution on a regional scale

***fluidyn*–PANAIR** has been validated in East American regions, is used when the simulation of the air quality for a particular area is necessary. It can evaluate the contribution of several habitats to the air pollution, including the vehicles, the heat emissions from industries and urban areas. The ozone formation and regional transport can be evaluated by means of different reactive schemes.

***fluidyn*–PANAIR** has been developed in collaboration with ADEME (French Ministry and Environmental Agency). ***fluidyn*–PANAIR** is composed of the below models:

- ***fluidyn*–PANROAD**
- ***fluidyn*–PANEIA**
- ***fluidyn*–PANTRAFFIC**
- ***fluidyn*–PANWIND**

***fluidyn*–PANROAD** is a three dimensional fluid mechanics software developed to simulate the dispersion of the pollutants emitted by vehicles on roads and highways. It takes into account:

- obstacles and high buildings;
- the influence of the vegetation and nature of the terrain on dispersion;
- effects of the solar radiation and the ambient atmospheric conditions through a user-friendly interface.

***fluidyn*-PANEIA** models the atmospheric dispersion of industrial emissions in the air, released from point or continuous sources. It is designed to allow environmental engineers, project managers as well as decision makers to confirm or ensure that their industrial sites comply to the set of regulations imposed by national regulations for air and health on atmospheric quality.

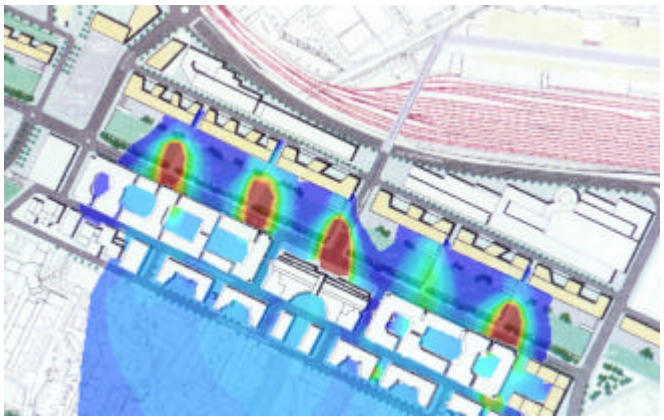
In order to model atmospheric dispersion, ***fluidyn*-PANEIA** uses a deterministic 3D resolution of the fluid dynamics Eulerian equations. In this regard, all the phenomena and parameters that could influence the transport / diffusion of pollutants in the air are taken into account:

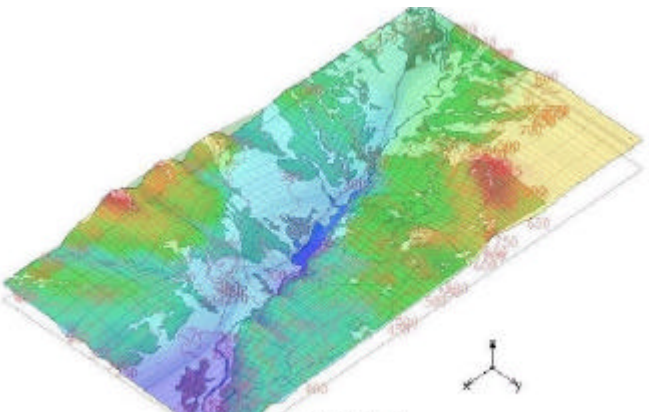
***fluidyn* – PANTRAFFIC** evaluates the emissions of gaseous pollutants (NOx, CO, HC, etc.) or particulate matter (PM10, Pb, etc.) emitted by vehicles starting from the available traffic data on different highways and roads, for a standard fleet of vehicles**.** ***fluidyn* – PANTRAFFIC** conforms to the directives laid down by the COPERT III European program. The emissions from road traffic are taken into account by ***fluidyn* – PANTRAFFIC** but other data obtained from the neighbourhood of the roads can also be added to the dispersion calculation.

- type of roads: urban, rural, highways
- type of traffic: yearly average, hourly average or peak hour
- topography and ambient conditions: steep slopes, temperatures
- percentage of heavy vehicles
- average velocity of the traffic
- Crossroads, signals, traffic jams, stop signs

The ***fluidyn*–PANWIND** model, integrated in all the software of **PANACHE** family helps to design a wind rose diagram on an undulating terrain for weak winds and for strong solar radiation on flat or undulating terrain in urban and peri-urban zone, by taking into account the influence of height. The wind fields are evaluated by a diagnostic or forecasting model. The effect of atmospheric turbulence is one of the elements aiding the software to provide good results.

In fact, ***fluidyn*–PANWIND** can take into account, depending on their availability, the stack emissions from neighbouring industries, the emissions due to urban heating or from any other significant pollutant source for predicting air quality. The results of the calculations are presented in the form of coloured contours displaying instantaneous or average concentrations, concentration profiles along the axis of circulation, wind fields etc. A tool, enabling the video animation of the results projecting the different stages of dispersion, is also integrated into the software





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