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HIGH RESOLUTION AIR MODELLING IN A DEEP VALLEY: ANALYSE OF CHEMICAL INDICATORS FOR MANAGEMENT OF ROAD TRAFFIC

G. Brulfert, J-P. Chollet, C. Chemel, E. Chaxel
Laboratoire Des Ecoulements Géophysiques Et Industriels (UJF, INPG, CNRS), Grenoble, France

Road traffic is a serious problem in the Chamonix valley: traffic flow and air pollution worry the inhabitants of the valley. The accident in the Mont-Blanc tunnel made it possible, in the framework of the POVA project (Alpine Valley Pollution), to undertake measurement campaigns with and without heavy-vehicle traffic through the valley, towards Italy (before and after the tunnel re-opening). The model ARPS 4.5.2 [Xue, 2000] enables to resolve the dynamics of this terrain where the relief is very complex. MM5 model [Grell, 1995] forces the downflow of a small central field (25 * 25 km). This model is coupled to the TAPOM 1.5.2 code of atmospheric chemistry [Clappier, 1998]. Initial and boundary chemical concentrations are provided by the continental model CHIMERE [Schmidt, 2001]. Using 300-metre grid cells to calculate the dynamics and the reactive chemistry thus makes it possible to represent precisely the dynamics in the valley (slope and valley winds) and to process chemistry calculation at the same scale. First results with the use of (H2O2/HNO3) and (O3/NOz) indicators suggest a VOC ozone control [Brulfert, 2003] in the valley. Various scenarios are run in order to assess respective impact of heavy duty and light duty traffic. In Chamonix (centre of the valley) a reduction of 50% of all valley traffic leads to an increase of 60% of ozone minima (28 ppbV). From numerical simulations, ozone evolution may be splitted into transport, chemical production and deposition at every location and at any time in order to identify undergoing process.