

10.2.1 Local Models (transport of less than 50 kilometers)

The dilution of pollutants emitted from sources and transported on the local scale is strongly dependent upon transport and diffusion processes, and less dependent upon chemical transformation, dry deposition, and wet deposition. Therefore, the majority of the models included in the survey do not include these latter processes as they have until recently been used primarily for assessing ambient concentration rather than deposition.

The local models may be classified into three main categories: 1) analytical; 2) Eulerian; and 3) Lagrangian. Presently, the analytical models are the most commonly used and most widely accepted for regulatory use, although they are the least versatile for incorporating the deposition processes. The Eulerian models are the most versatile but they are more expensive and complicated to use, and have not been applied as extensively on the local scale. Few decision makers are familiar with these models and able to interpret the results effectively. Also, a very small number of evaluation studies have been carried out on these models. Lagrangian models have not been used as extensively as the analytical models but they have been applied more than Eulerian models. These models are rather versatile and can include, with some simplifications, parameterizations of the deposition processes. While more evaluation studies on these models have been conducted than on Eulerian models, the need for more extensive evaluations is apparent.

Application of all three types of models in regions with complex topography can be expected to provide results which have a greater uncertainty than those applied in flat terrain. Research is needed to determine the performance of models which incorporate deposition processes, in various regions (shoreline, plain, mountain valley, etc.).