time we are uncertain about the fraction of emitted sulfur that is deposited within the emission area itself. Possible reasons for these differences are: (1) the inadequate spatial resolution to accomodate near-source region contributions to air pollution concentrations; (2) the variations in the distributions of the emissions used in the models; (3) the variations in the vertical resolution and treatment of vertical diffusion among the long-range transport models; (4) lack of detailed chemistry in the models especially close to sources; and (5) the variations in the way that the models treat the deposition processes. Therefore, consideration should be given to using local and mesoscale models for estimates at distances smaller than 300 km.

Recent modeling survey papers, which are referenced in this report, indicate that there are many models presently in use for predicting local/mesoscale air pollution concentration distributions.

(a) Local Models (transport of less than 50 km)

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 processes, as they have in the past been used primarily for assessing ambient concentrations 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.