While more evaluation studies have been conducted on these models 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 that have a greater uncertainty than those applied in flat terrain. Research is needed to determine the local performance of models in various regions (shoreline, plain, mountain valley, etc.) that incorporate deposition processes.

(b) Mesoscale Models (transport of 50 to 300 km)

The survey of dispersion models, applicable for this intermediate range, indicates the availability of more than 50 models. The survey includes the following categories of models: 1) analytical, 2) Eulerian, 3) Lagrangian, and 4) hybrid (a combination of Eulerian and Lagrangian). In addition to the more common attributes of long-range transport models, that is, transport and diffusion, physical and chemical transformation, and wet and dry deposition, other features important for intermediate-range transport are considered in the survey. These other significant features include the models' capability to: (1) resolve vertical pollutant distributions, (2) accommodate urban emissions, and (3) simulate detailed atmospheric chemistry.

A mesoscale model validation workshop was recently conducted at the Savannah River Laboratory. A report indicated that model predictions were reasonably accurate for annual averages, but that the accuracy decreased with decreasing averaging times. A general conclusion from this workshop was that the overriding meteorological factor in improving computational accuracy was the accurate description of the wind field. The model evaluations were performed using a non-reactive pollutant, Kr^{85}. Of course, for reactive pollutants such as sulfur oxides, improvements will have to be made in the chemistry modules.