

ASTRAP Model

The Argonne National Laboratory has developed the Advanced Statistical Trajectory Regional Air Pollution Model (ASTRAP) under the MAP3S Program for simulating regional sulfur concentrations and depositions on a monthly and annual basis (Shannon, 1980).

The ASTRAP model takes a statistical approach to long-term regional modeling rather than a day-by-day simulation technique. The ASTRAP model is based on the assumption that for long-period averages, i.e., one month or longer, horizontal and vertical dispersion processes can be separated.

The long term horizontal dispersion of individual puffs is represented by dispersion statistics. Vertical dispersion is simulated by numerically integrating the standard one-dimensional diffusion equation to a height of 2100 m.

The transformation and dry deposition processes are linearly parameterized. The wet deposition is a one-half power relationship of precipitation rate. In the ASTRAP Model, seasonal and daily variations in all parameters are taken into account. A wind field is developed from National Weather Service (NWS) data at 1000 metres in the winter and 1800 metres in the summer.

Preliminary model runs have been made in the eastern United States and Canada using 1974 and 1975 meteorological data. The emission inventory (MAP3S) consisted of both point