

mixed layer pollutants. Since sulfur dioxide to sulfate conversion is fairly rapid within clouds, ignoring mass transport by clouds would certainly result in an underestimation of the sulfate in precipitation. The MOE model accounts for this by assuming an apparent washout coefficient which is derived from the fact that the rate of removal of sulfate by precipitating clouds would be nearly equal to the rate of entrainment of sulfur dioxide by the clouds. This implicitly assumes rapid conversion of sulfur dioxide to sulfate within clouds. Ignoring vertical mass transport also affects the distribution of mass within the mixed layer. It should be noted that large scale mean vertical velocities are of the order of 1 centimeter per second which is comparable to the dry deposition velocity of sulfur dioxide and much larger than the dry deposition velocity of sulfate.

Transport of mass along a single trajectory is influenced by all the small scale phenomena described above. None of the models considered here explicitly treat these phenomena, but the errors associated with the neglect of small scale processes are likely to be less severe when averaged over an ensemble of trajectories. The following are some recommendations to alleviate some of these problems in the current models:

1. In order to assess the effects of the coarse time and space resolution of the network of radiosonde stations that is used with the present LRT models, a denser network of atmospheric sounding stations should be established covering an area of about 500 by 500 kilometers with a spacing of about 100 kilometers. The vertical distribution of wind and temperature should be sampled about 8 times per day, and the sampling should extend to a height of at least 4 kilometers. This network should be able to detect some of the smaller eddies that are undetected by the present network, as well as provide information on wind shear and fluctuations in the surface mixed layer.