

trajectories from the southwest and northwest sectors, leading to strong maxima in the deposition from these sectors. On the other hand at Champaign, only the southwest sector showed a large peak in deposition. In a recently published study for Bermuda, precipitation has been monitored on an event basis since May of 1980. With air arriving from the sector southwest through north (that is, the North American continent) the average rainfall pH is 4.4; for the remaining directions the average is about 5.0. For the west sector about 50% of the rain events had a pH of less than 4.5. In the remaining sectors only 5% of the rain events had a pH of less than 4.5.

In summary, these independent studies all indicate a very strong association of highest air and precipitation concentrations of sulfate (and nitrate) and lowest pH with air arriving from the region of greatest emissions in North America. In effect this analysis produces the simplest form of source-receptor relationship that can be generated. It is, therefore, useful for identifying in a general and qualitative way which source regions are responsible for the air concentration and deposition at a given site. While the sector(s) of origin can be identified, this analysis cannot distinguish between nearby and more distant sources. The modeling described in Chapters 7 and 8 expands upon this sector analysis principle in a quantitative way to arrive at such estimates.

6.6

Mass Budget Studies

This approach uses existing data, averaged over appropriately large time and space scales to examine the fluxes of constituents of interest into and out of a selected portion of the atmosphere. An inherent assumption is that on these large scales a steady state condition exists and that the concept is most useful where emissions