

and the climatological regime is reasonably homogeneous. It does not take into account enhanced local deposition that may take place near strong emission sources, and hence the removal terms may be overestimated by an unknown, but probably small, amount.

Several global budget estimates have been made over the last 20 years, but only in the last few years have regional budgets been prepared for eastern North America using data from the 1970's (the detailed results of various fluxes are given in Table 4.5.1 of Report 2F-I). Some of the most important findings of these studies follow.

Man-made sulfur emissions in eastern North America exceed natural ones by a factor of 10 to 20. When considering eastern North America as the budget region, one finds that the three "removal" terms, dry deposition, wet deposition and outflow, are of a comparable magnitude. The ratio of wet to dry deposition is greater in Canada than in the USA. This is a reflection of the proximity to emission sources; that is, dry deposition is greater in the eastern USA where emissions are larger. Approximately 30-40% of the sulfur emitted in eastern North America leaves the continent to the east. Finally, it is found that the magnitude of the transboundary flux of sulfur from the eastern USA to eastern Canada is comparable to eastern Canadian emissions; whereas, the Canada contribution to the USA is a factor of 3 to 5 smaller, and amounts to approximately 5% of eastern USA emissions.

In this last finding are the beginnings of the transfer matrix concept, to be discussed more fully in Chapter 8, that indicates the relative importance of various sources to receptors; in this case only two, namely Canada and the USA on a gross scale. Numerical modeling can produce such relationships on a finer space scale involving many source and several receptor regions.