Only one network operating in North America, has been routinely monitoring air concentrations of sulfur dioxide and sulfate at regionally representative rural locations for several years; it is the Air and Precipitation Network (APN) in Canada. Data from 4 sites in 1979 have been analyzed. It should be noted that the three eastern stations are within or downwind (most of the time) of the major emission source regions. The fourth station (ELA-Kenora) is upwind (most of the time) of the emissions. For sulfur dioxide, all stations show a seasonal variation with a winter maximum and a summer minimum. All eastern stations show a summer maximum in sulfate, an oxidation product of sulfur dioxide, indicating a summer maximum in the conversion rate of sulfur dioxide to sulfate. At ELA-Kenora the seasonal variation is different with both species having a maximum in winter. Here the southward depression of the westerlies over the mid-continent and the Arctic high pressure areas over central-northern Canada result in the maximum frequency of easterly winds which can transport both sulfur dioxide and sulfate to Kenora from the eastern source regions at concentrations greater than summer levels.

6.3.3 Wet versus Dry Deposition

The data from the APN sites can also be used to estimate the relative importance of wet and dry deposition of acidic species. Using the most recent techniques to estimate dry deposition rates from the air concentrations, and calculations of wet deposition rates as the product of the precipitation amount and the precipitation concentration. At the station closest to the sulfur sources (that is, Long Point) wet and dry deposition rates are approximately equal most of the year. At sites more distant from emissions, wet deposition is greater than dry by up to a factor of 5 for most of the year. The ratio of dry to wet is higher in winter than in summer since, in winter, ground level sulfur dioxide concentrations are highest and precipitation amounts are lowest.