

When cloud and rain water are present, the rate of conversion and deposition of emitted sulfur dioxide may be much more rapid than under dry conditions and, therefore, the influence of local emissions may be important. The conversion of SO_2 to sulfate will depend upon the chemical makeup of the cloud and rain water including the concentration of oxidants and catalysts, and the fraction of time that the polluted air parcel spends in a cloud. The rate of removal of sulfur by precipitation will, in addition, depend upon the frequency and intensity of the precipitation.

Despite the possible variability in the relative influence of local sources, enough evidence now exists of the rapid conversion and deposition of local SO_2 emissions to warrant further research and analysis into the important factors governing deposition close to a source. Furthermore, models capable of accounting for local deposition should be applied, tested and further improved.

10.1.2 Nitrogen Compounds

Nitrogen oxides are transformed to nitrate more quickly than sulfur dioxide is transformed to sulfate. Furthermore, a large fraction of these nitrogen oxides are emitted close to the ground (from vehicles) greatly enhancing the potential for near-source deposition. One might expect therefore, that the local deposition of nitrogen oxides will be more pronounced than that for sulfur dioxides. However, less information exists about the local deposition of nitrogen compounds than about sulfur although some investigators have estimated that the deposition of nitrate in the vicinity of St. Louis is comparable in magnitude to the emissions from that city.