and found that the maximum concentration in the collected precipitation increased several-fold over regional background values and was located downwind of the city. No estimate was made, however, of the fraction of locally emitted material that was deposited locally and, therefore, this study does not contradict that of Rodhe (1970) referred to above. However, in a later paper, Högström (1974) measured the wet deposition of sulfate at 100 sampling points within 60 km of Uppsala and estimated that two-thirds of the sulfur emitted during precipitation was deposited within 50 to 100 km of the source. He also concluded that 98% of the emitted sulfur was rapidly oxidized and deposited as sulfate during the precipitation events. Of course, the long-term average would be much lower. It should be pointed out that Uppsala (population approximately 100,000) is a rather unusual urban source, not typical of a North American city, in that approximatly 65% of the SO_2 emitted in that city comes from a single district heating plant. The height of the stack, however, was only 40 m.

In the vicinity of Sundsvall, Sweden, approximately 30 lakes have been judged to be sensitive to further deposition of atmospheric acid. A survey of the sulfur content of snow samples in the region indicated that emissions from smelters within a few kilometers contribute greatly to the deposition. The observed pattern of deposition coincides almost exactly with the lakes that have been affected most by acidification (Sundsvalls Kommun, 1980).

Esposito et al. (1980) propose that in the northeastern United States, primary emissions of sulfate from the combustion of residual oil in power plants and, to a greater extent, in commercial and residential boilers, and the accompanying emissions of vanadium and nickel catalysts are a major cause of acid precipitation. These authors also contend that primary sulfate from oil-burning-power plants and oxides of nitrogen from local motor vehicle exhausts are an important factor in the acidification of precipitation in Florida and in California. However, their thesis is based upon emission estimates and a box model, the chemical processes in which are not described in their paper, and needs to be further supported by more detailed evidence and by meteorological studies such as back-trajectory analyses. Shannon (1981) used his statistical trajectory model to estimate the relative impor-