measurements. The only such measurements, published by Gartrell et al. in 1963, are probably flawed (Newman, 1980). However, some workers have inferred from other data that "wet" transformation rates of SO_2 can be greater than 10% h^{-1} (Dana et al., 1975; Enger and Högström, 1978; Scott, 1980).

There have been few relevant investigations of the impact of point sources on the mesoscale dry deposition field, as determined by field studies because of the difficulty in making direct dry deposition measurements. Husar et al. (1978) and Gillani et al. (1978), in their studies of the Labadie power plant plume, used plume mapping and subsequent sulfur budget estimates, and found mid-day removal rates as high as 10% h^{-1} for sulfur dioxide, with negligible values during the night when the plume is decoupled from the ground. The percentage of the power plant emissions deposited was a function of the time of release of the emissions, and could approach 50% after one day under certain conditions. These results apply to summertime conditions, and rates would be correspondingly lower in more stable, winter atmospheres (see, for example, de Wys et al., 1978). Barrie (1980) used artificial deposition surfaces to examine dry deposition patterns of sulfur and heavy metals around an isolated power plant in the summertime. He found that dry deposition processes removed only about 1% of the primary particulate sulfur and vanadium (a metal released mainly with power plant emissions) within 25 km. Wintertime total deposition measurements (i.e., dry and wet deposition) around the same plant showed that less than 0.5% of the total sulfur was removed within 25 km--results that are similar to those obtained under wintertime conditions by Summers and Hitchon (1973) in the vicinity of a sour gas plant, who found that less than 2% of the emitted sulfur was deposited within 40 km.

From the limited data discussed above, it is difficult to generalize the impact of point sources on mesoscale dry deposition. One can say, on theoretical grounds, that the relative contribution of a given source to dry deposition will depend on its emission rate, the local meteorology, the time of year and surface characteristics of the surrounding area, nature of the emissions from the source including source height and emission rate, and especially the "background" deposition from natural and anthropogenic sources. The effect of local emissions on the regional dry deposition field can be estimated by superimposing on regional background concentration levels