Pertinent field experiments are summarized in tabular form in this section.* Although it is impossible to adequately summarize the results of this ensemble of studies here, several key aspects may be noted with regard to the efficiency of wet removal of commonly emitted pollutants. Starting with the local scale, it generally has been observed that SO_x emitted from power-plant stacks is removed with low efficiency by storms occurring near the source. This is true also for NO_x, and in fact there are very few local plume measurements that have detected any rainborne NO_x whatsoever above background. This situation seems to change as atmospheric residence times increase to mesoscale proportions. Studies of urban-plume scavenging, for example, have observed several tens of percent of the SO_x pollutant burden to be removed in the 0 to 100 km range, with lesser but still significant removals of NO_x. On a regional scale an inversion seems to occur, wherein the wet-removal of NO_x is actually greater (in proportion to its regional emission rate) than that from SO_x. Although the competing effects of dry deposition probably play an important role in influencing this behavior, the general increase of wet deposition with scale provides a strong indication that the atmospheric aging process has a significant influence on precipitation scavenging efficiency.

Mathematical models of precipitation scavenging tend to reflect the stepwise sequence discussed above. Based upon conservation equations for pollutant material, these models are similar in many respects to typical air pollutant models, but differ in the sense that they must account for gas-liquid exchange and wet delivery. A profusion of different wet removal models is currently available, and is presented in tabular form in this section.* Despite this abundance of models, however, there is still a strong need for reliable techniques for characterizing wet removal with adequate precision. The relatively poor predictive capability of present models stems from a lack of knowledge regarding attachment and chemical conversion processes, as well as from the difficulty in providing an adequate mathematical characterization of the complex dynamical behavior of storm systems. Much remains to be accomplished in this research area before a really satisfactory modeling capability is obtained.

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*Reference is to complete original document.