5.   Since LRT models do not presently employ chemical mechanisms to predict concentration fields of free radicals, which have important spatial-temporal variations, it is unlikely that they can correctly predict the present quantity and deposition pattern of H_2SO_4 formed through gas-phase reactions.

The likely effects of these types of reduction of H_2SO_4 formation in the gas phase are presented in Table 4.2.

The aqueous-phase oxidation of SO_2 in wet particles, cloud nuclei, fogs, dew and raindrops is thought to be due mainly to H_2O_2, with some contribution from O_3. On the regional scale, this H_2SO_4 formation pathway suggests the following implications:

1.   The reaction rates are non-linear in regard to SO_2 because the atmospheric liquid water content is not constant over time and space. The O_3 reaction possesses an additional non-linearity due to a dependence on the inverse H^+, which causes the reaction to cease being important for pH < 4.

2.   Since the LRT models do not employ the H_2O_2 and O_3 concentration fields, which have important spatial-temporal variations, it is unlikely that they can correctly predict the present quantity and deposition patterns of H_2SO_4 formed through the aqueous-phase reactions.

3.   The rates are first order in SO_2. However, H_2O_2 oxidation of SO_2 should be viewed as limited by the reactant present at the lower concentration. If SO_2 concentration in water exceeds that of H_2O_2 in water, then a reduction in H_2O_2 will yield a direct reduction of H_2SO_4 formation. In this case, a reduction in SO_2 concentration will produce no significant