that occur between the point of emission and deposition, which are shown in Fig. 3. Significant acidification in the atmosphere occurs between the time and points of pollutant emission and removal. The quantities of strong acids (H_2SO_4, HNO_3) in the atmosphere are increased significantly by the oxidation of SO_2 and NO_2 through direct photochemical production of gas-phase strong oxidizing free radicals, production of stable gaseous oxidants, and aqueous-phase oxidation reactions. Other strong acids such as HCl and H_3PO_4 are either emitted into the atmosphere directly, or formed by acid displacement reactions of H_2SO_4 and HNO_3 with inorganic salts of Cl^- and PO_4^{3-}. The most important inorganic species that govern the acidic nature of dry and wet precipitation are:

cations: H^+, NH_4^+, Na^+, K^+, Ca^{2+}, Mg^{2+}
anions : OH^-, SO_4^{2-}, NO_3^-, Cl^-, PO_4^{3-}, SO_3^{2-}, CO_3^{2-}.

The long-range transport (LRT) models used by Work Group 2 (see Table III) account for the formation of H_2SO_4 through a simple, linear rate law, which is:

$$\frac{d[H_2SO_4]}{dt} = \frac{d[SO_4^{2-}]}{dt}$$
$$= k_S[SO_2].$$

The rate constant k_S includes the combined rate constants SO_2 oxidation for all major pathways. For this linear representation of the H_2SO_4 formation rate to be reasonable, some necessary conditions are:

a. each of the major SO_2 oxidation processes must have a first-order dependence on SO_2 concentration,

b. each of the major SO_2 oxidation processes must be linear in dependence on SO_2 concentration, and each of the pseudo-first order rate constants must not change over the period that they are assumed to be constant. For some of the LRT models identified in Table III,