fall velocities, while alkaline particles are usually larger (> 10 micrometers) and have much shorter residence times and higher fall velocities. Thus, the higher one goes in the atmosphere the greater is the expected average ratio of acidic to alkaline materials. Similarly, at sites distant from sources of these materials, the very low total particulate content of the atmosphere tends to be dominated by neutral to acidic rather than alkaline particles.

What is not so clear is the source of the sulfate that is found as part of the global background. Two sources have been suggested. One is natural emissions of sulfur from the oceans (especially in tropical regions), coastal areas and swamps. The other is the very long range transport of anthropogenic emissions. There is some evidence to support both of these, but more analysis is required to establish whether either, both, or some other sources, are the most significant contributors.

The implications of these observations for eastern North America can be summarized as follows. While the low pH values observed on occasion in remote areas are perhaps at first surprising, reasonable explanations for their occurrence have been offered. The extreme low pH (or high acidity) values in remote locations may on occasion be lower than the annual averages in the most heavily impacted region of eastern North America (see Section 6.2.2). But when considering the overall significance of these observations, particularly for assessing effects, a comparison of median values of acidity is more appropriate and these are at least three times higher in eastern North America than at remote locations. There is undoubtedly a contribution to the deposition of acidity in eastern North America associated with North American natural sources and also the world wide background (either from natural sources or ultra long range transport from man-made sources far upwind). In principle, all atmospheric LRT models could take this into account and in fact three have done so (see Chapter 7)