3.148 Measurements of hydrogen peroxide and formaldehyde concentrations at ground level and in the high-altitude atmosphere over a rural site in central Japan.

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Abstract:

Measurements of H_2O_2 and HCHO concentrations were performed at ground level and in the high-altitude atmosphere using a helicopter over Toyama Prefecture, Japan. The H_2O_2 and HCHO showed clear seasonal variations with highest concentrations in the summer. The H_2O_2 was well correlated with the O_3 in July and August whereas there was no correlation between O_3 and H_2O_2 in May and June. There was a negative correlation between NO_X and H_2O_2.Significantly high concentrations of H_2O_2 were observed in the summer when air pollutants were transported from the industrial regions in China. Trans-boundary air pollution may significantly affect harmful influence on vegetation.
The concentrations of H_2O_2 and HCHO at high-altitude were analyzed by a HPLC system within 5-10 minutes after the sampling. The H_2O_2 over Toyama was lowest at the surface and highest H_2O_2 was detected at the altitudes of 6,000 and 8,000 ft. On the other hand, the HCHO was highest at ground level. The concentrations of H_2O_2 were higher than those of SO_2 at high-altitude in the summer, however the H_2O_2 was usually lower than the SO_2; this condition is called *oxidant limitation* during cold months. If H_2O_2 concentration rises in cold months, the acidification of cloud water may be accelerated at high elevations in central Japan where air pollution is actively transported.