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Urban ozone and East Asian back-ground ozone measured in Oku-Nikko mountainous area near Tokyo

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Photochemical ozone transported from Tokyo metropolitan area is pointed out to be one of the important causes for the forest decline observed in the Oku-Nikko mountainous area. On the other hand, it was reported that the Asian back-ground ozone was increasing. The effect can be observed near the top of mountains far from metropolitan area. In order to see both the effects on the variation of ozone, we monitored ozone in the mountains of Oku-Nikko, which located about 150 km north of Tokyo. We set up an ozone monitor near the top of Mt. Mae-Shirane in Oku-Nikko. Twenty Ni-Cd batteries were set for electric power supply, and 20 solar panels were also set to charge those Ni-Cd batteries during day time. On the basis of three months (from late July to early October) observation of ozone in 2002 and in 2004 we could analyze the long term variation of ozone there. The concentration of ozone was dependent on the weather conditions. The highest concentration in summer was ~80 ppb. High concentrations of ozone were recorded in the evening in summer when polluted air mass was transported from the Kanto Plane. High concentration of ozone appeared when the south wind prevailed and solar radiation was strong. On the other hand, in autumn, ozone was very constant around 40 ppb. No significant diurnal variation was observed. The influence of free troposphere was suggested in autumn. The air mass came from the west after passing over the Sea of Japan. It is indicated that the air mass containing Asian background ozone had reached this area in that season.

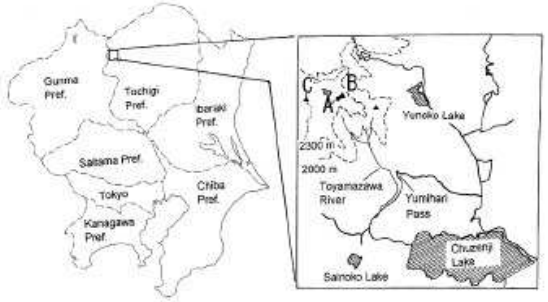

Figure 1: Location of Oku-Nikko area and observation sites.
A: observation site, B: Mt. Mae-Shirane, c: Mt. Oku-Shirane.