Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

PEM06-P01 Room:Convention Hall Time:May 26 18:15-19:30

Observation of Ozone concentration relation to meteors echo duration distributions by a forward scattering radar

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Several studies have concluded the existence of secondary maxima of ozone concentration at the mesospheric level of 85-90 km. At this level in atmosphere, meteor radio observations shows a consistent lack of long overdense echoes with certain durations where the number of meteor echoes drops for what is known as the ‘knee’ position. As the lack of long meteor echoes was significantly greater than being only a result of ambipolar diffusion, some studies linked this drop to ozone concentration in the meteor region. Baggley and Cummack (1974) suggested the drop to be the result of oxidation of meteors ions by the secondary maxima of ozone layer which causes the removal of ionization and consequently unreflected radio signals. Jones et. al (1990) and Cevolani and Pupillo (2003) supported this conclusion by analyzing meteor echoes duration distributions and determining approximately the height of meteor echoes at the knee point based on visual magnitude levels.

At Kochi University of Technology (KUT) we attempted to observe the knee position in selected meteor showers. The 5 channel HRO interferometer radar developed at KUT utilizes forward scattering of 53.75 MHz continuous radio signals emitted from Sabae station, Fukui prefecture, Japan (Fukui National College of Technology: FNCT) at a distance of 340 km from Kochi prefecture. The software HROFFT (Ham-band Radio meteor Observation Fast Fourier Transform) generates spectrogram images for meteor echoes in 10 minute intervals. These images are used by the developed auto counting software Meteor echo counter through image processing to automatically count meteor echoes and their durations. The critical duration T at which the drop occurs in long echoes counts can be indicative about the Ozone concentration by the relation derived by McIntosh and Hajduk (1977): O_3=(αT)ˆ(-1). As currently there is no developed mechanism for meteor height determination at KUT, the scope is focused on the analysis of meteor echoes duration, detection of the knee point and then finally comparing the ozone concentration measurements to the results of similar studies.

References:

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Keywords: Ozone concentration, meteors, forward scattering, radar, mesosphere