Relationship between solar flare level and occurrence characteristics of type III bursts

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Type III bursts are impulsive radio bursts generated in association with solar flare. Their occurrence frequency has wide band and changes fast from higher to lower. As for their generation process, it is generally considered that the electron beams accelerated by magnetic reconnection excites plasma waves (Langmuir waves), then the waves are converted to electromagnetic waves. The detailed conversion processes and electromagnetic environment required for the generation have been studied for a long time, but they have been still discussed. Type III bursts have been commonly studied with X-ray flares because the X-ray emission is also generated by accelerated particles associated with flares. Soft X-ray is considered to have considerable energy of flare and used as a value to indicate a size of flare.
In this study, we have analyzed spectral structures of type III bursts observed with AMATERAS, the meter wave range radio spectro-polarimeter for solar radio observations at Tohoku University. We have compared frequency spectral with time variation of GOES soft X-ray flux, and found that type III bursts often appeared in the non soft X-ray flare period having almost same structure as in the soft X-ray flare period. This fact indicates some particle acceleration processes occurred even in the non flare period. We have investigated spectral characteristics, such as drift rates and intensities, of type III bursts for the periods of both flare and non flare to reveal difference of particle acceleration processes.
In the presentation, we will show the relation between occurrence characteristics of type III bursts observed in 2014 with AMATERAS and GOES soft X-ray flux level, and will discuss particle acceleration processes particularly in the non flare periods.

Keywords: radio burst, flare, particle acceleration

