# 木星磁気圏サブストームと関係するnKOM放射の特徴についての研究

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# Study of the characteristics of nKOM emissions correlating with substorm-like events in the Jovian magnetosphere

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Jupiter has the largest magnetosphere in the planets of our solar system, which has been produced by its rapid rotation period (about 10 hours), strong intrinsic magnetic field and internal source of heavy plasma originated from Io plasma torus (IPT).

The observations by the Galileo orbiter revealed that there were quasi-periodic phenomena in the Jovian magnetotail, such as radial flow bursts of energetic particles [Krupp et al., 1998, Woch et al., 1998] and the variation of radial and north-south component of the magnetic field [Krupp et al., 1998], which imply magnetic reconnections and the periodic thinning and thickening of the plasma sheet. The signatures of these events were similar to the terrestrial substorm, so they are called ”substorm-like events (SLE)” [Woch et al., 1998]. Furthermore, the Cassini spacecraft performed Jupiter flyby around the end of 2000 and observed the Jovian magnetosphere in collaboration with Galileo.

It is known that there are radio emissions from the Jovian magnetosphere which correlate with SLE. In the preceding studies, Louarn et al. (2001, 2014) reported the narrow-band KilOMetric radiation (nKOM) correlated with inward flow burst and variation of the north-south component of the magnetic field during SLE. X-lines where the SLEs are thought to start were located at around 60-80 Jovian radii ($R_J$) [Woch et al., 2002], while the source of nKOM is suggested to be located at the outer edge of the IPT (6 - 10 $R_J$) [Reiner et al., 1993]. The report implies that the generation process of nKOM relates to the reconnection at the magnetotail. However, it has not been revealed well yet how inner (6 - 10 $R_J$) and outer (60 - 80 $R_J$) magnetospheres couple each other during SLE.

The purpose of this study is to reveal the coupling process of the formation of the source of nKOM at the inner magnetosphere (6 - 10 $R_J$) and the reconnection at the magnetotail (60 - 80 $R_J$). To study this process is important in order to understand the radial transport of the energy and the magnetic flux tube in the Jovian magnetosphere and the proceeding processes of the global dynamics of the Jovian magnetosphere (as suggested by Kivelson et al. (2005)).

In this study, we have analyzed nKOMs obtained by Galileo and Cassini to discuss their characteristics, such as its time series variation and the location of the formation of their sources. We obtained that the positions of the formation of new nKOM sources were not fixed on specific localtime. Additionally, we have also estimated the lifetime of energetic electrons which are thought to correlate with nKOM emission by adapting method for the energetic plasmas in terrestrial magnetosphere suggested by Wentworth et al.(1959) As the result, It is suggested that the electron of about 10 keV is necessary to explain the duration of nKOM emission (several rotation periods).

In this presentation, we will show preliminary results on occurrence characteristics of nKOM observed by both Galileo and Cassini relates with inward flow burst caused by the Jovian SLE and lifetime of energetic electron to explain the duration of nkOM emission.