Waveform analysis of Jovian S-bursts

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Jovian S-bursts are characterized by their short duration time and rapid negative frequency drift with the drift speed within a range from -5 to -45 MHz/sec. It has been also understood that these S-bursts are generated by the interaction possesses between the Jovian magnetosphere and the satellite Io. Recently, Carr et al. (1999) analyzed the waveform of the S-bursts and reported that an S-burst consists of several subpulses. The wave coherency is maintained within a subpulse. Investigation of the waveform of S-bursts is, then, thought to be an important clue to solve the problem of the origin of the coherent nature not only of Jovian decametric radiation burst also of the planetary radio emissions. The time scale of the wave coherence is thought to reflect the nature of the microscopic instabilities where efficient wave-particle interaction is taken place. In the present study, the waveform analysis of the Jovian S-bursts has been made by using the data obtained at the decametric radio wave observatory of Tohoku University. As a result, the subpulses in the S-bursts discovered by Carr et al. (1999) have been identified also in these data. Furthermore, it has been found that the duration time of the subpulse varies with the wave frequency, revealing a clear tendency that the duration time of the subpulse decreases with decreasing the wave frequency. For the purpose of the understanding of the underlying physical process of the Jovian S-burst phenomenon, the present waveform analysis will provide us an important key concerning the generation of coherent radio emissions from planets.