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Effects of Saturn and its moons in the long-periodic variations of the nearby magnetic field and SKR

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Long-periodic (LP) modulations of intensity of SKR recorded by RPWS instrument onboard Cassini spacecraft were studied by means of a combined data analysis algorithm based on a "sliding window" Fourier procedure and the nonlinear Wigner-Ville method. Comparison with the results of the similar analysis of the near Saturn magnetic field modulations is performed. The analyzed SKR data record covers the years 2004-2005, whereas magnetic field data correspond to the second half of 2004 and the beginning of 2005. It has been found that SKR has well pronounced impulsive modulation, with quasi-periodic pulses appeared approximately each 10.74 hours. The period of SKR pulses, in spite of the overall stability, has sometimes the disturbances within the interval of 10.74 - 10.76 hours. Specific 10.76 hour modulation is also detected in the magnetic field. It becomes especially strong in the periods when the spacecraft appears inside the Saturn magnetosphere. The nature of 10.7 hour SKR pulses and analogous features in the magnetic field variations are believed to be related to the rotation of Saturn.

Besides of the 10.7 hour pulses, the intensity of SKR has several more long periodic modulations caused mainly by variations of solar surface activity and its signatures in the solar wind. In the present study we pay special attention to the possible manifestation of some saturnian moons in modulations of SKR and the near Saturn MF. Performed analysis shows that specific modulations of SKR with periods corresponding to orbital motions of Enceladus, Tethys, as well as Titan and Hyperion were detected. By this, the line of Titan is also well pronounced in the magnetic field fluctuation spectrum. The discovered correlation between the intensity of the Titan modulation

line and the position of Titan relative SKR source, discloses the nature of the moon control of SKR.