

レイトレーシング法によるプラズマ圏内における磁気音波からEMIC波動へのモード変換過程の解析  
Ray tracing of mode conversion process from magnetosonic mode waves to EMIC waves inside  
plasmasphere

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Magnetosonic waves (MSWs) are electromagnetic emissions of X-mode waves, which are typically  
generated at frequencies between the proton cyclotron frequency and the lower hybrid resonant  
frequency. Our previous studies using the Van Allen Probes EMFISIS data indicated that MSWs  
converts to EMIC waves inside the plasmasphere when the frequency of MSWs corresponds to the cross  
over frequency, so that plasmaspheric MSWs can be an origin of plasmaspheric EMIC waves. In order  
to investigate the mode conversion process from MSWs to EMIC waves inside the plasmasphere in more  
detail, we perform the ray tracing simulation for MSWs generated inside plasmasphere, using the  
code developed by Kanazawa University. In this simulation, the initial wave normal angle is almost  
90 deg. The ray of waves depends on wave frequency if the initial wave azimuthal angle is almost 0  
deg, i.e., earthward direction. On the other hand, the ray of waves does not depend on the  
frequency if the initial wave azimuthal angle is larger than 10 deg. Additionally, we confirm the  
mode conversion from R-mode to L-mode at lower frequency components of MSWs, while higher frequency  
components of MSWs remain R-mode. The simulation results are consistent with the Van Allen Probes  
observations which show the conversion of plasmaspheric MSW to EMIC waves.

キーワード：磁気音波、Van Allen Probes、モード変換

Keywords: magnetosonic waves, Van Allen Probes, mode conversion