Plasmaspheric EMIC waves excited through mode conversion from equatorial noise under existence of M/Q=2 ions

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Equatorial noise (EN, and referred to as magnetosonic mode waves) emissions are observed inside and outside the plasmapause and propagate across the magnetic field. In this study, we found the mode conversion from EN to EMIC waves in the plasmasphere using the plasma wave data from Van Allen Probes and Arase. When EN propagates into the earthward across the field line toward the Earth, EN splits into different waves modes; EN, and EMIC waves with the existence of M/Q=2 ions (deuteron or alpha particles) in the deep plasmasphere and the topside ionosphere. The oblique EMIC waves are excited through this mode conversion process, which are different characteristics of the propagation directions from EMIC waves generated from other processes. This mode conversion contributes to an origin of the plasmaspheric EMIC waves, especially at L<2.

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