# Transport and acceleration of electrons trapped in the inner magnetosphere in response to interplanetary shock

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Interplanetary (IP) shock is known to disturb directly energetic trapped electrons in the inner magnetosphere. Recently, it has been pointed out that electrons are accelerated due to interaction with whistler mode waves. The whistler mode waves are excited by anisotropic electrons in the keV-range. It may be possible that the IP shock influences the keV-range electrons, enhancing the energetic electrons indirectly. To understand the direct and indirect processes, we need to track the overall evolution of the electrons from keV to MeV ranges in response to the IP shock. In this paper, we used The global MHD simulation (Tanaka, 2015; Ebihara and Tanaka, 2015) and Comprehensive Inner Magnetosphere-Ionosphere (CIMI) model (Fok et al., 2014). In MHD simulation, as the boundary condition to obtain steady state magnetosphere, solar wind velocity (Vsw) is 400 km/s, density (Nsw) is 5 /cm$^3$ and interplanetary magnetic field (IMF) is 5 nT and northward. For imitation IP shock, we made Vsw sqrt 6 times, Nsw 6 times and IMF southward. In CIMI model, as the initial condition, we used AE8 model and kappa distribution ( $\kappa = 4$) and the boundary condition is from MHD simulation. We found that the temperature anisotropy increased at four points (MLT = 12, L = 4.7 : MLT = 0, L = 5.2 : MLT = 0, L = 4.5 : MLT = 8, L = 5). At MLT = 12, L = 4.7, shock-induced E-field accelerated electrons and the flux of electrons with energy more than 1 keV increased, resulting in temperature anisotropy over 0.4. At MLT = 0, L = 5.2, convection E-field accelerated electrons and the flux of electrons with energy about 15 keV increased, resulting in temperature anisotropy over 0.5. At MLT = 0, L = 4.5, substorm-induced E-field accelerated electrons and the flux of electrons with energy about 20 keV increased, resulting in temperature anisotropy over 1.7. At MLT = 8, L = 5.0. the flux of electrons energy with about 100 keV and 1 keV increased, resulting in temperature anisotropy over 0.4. Addition to this, we should consider the temperature anisotropy of the electrons what have the resonance velocity with chorus waves. We call this temperature anisotropy as $A^-$. We will reveal the time change of $A^-$ and electrons what is the cause of $A^-$ increasing.

 