Whistler wave bursts near a reconnection region in the magnetotail

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Observatory, Japan — Bursts of right-hand polarized electromagnetic waves with
frequencies around 100 Hz (a few times less than the local electron cyclotron fre-
quency) and a bandwidth 100-200 Hz are observed near a reconnection site in the
magnetotail by the Cluster spacecraft. The waves are interpreted as propagating
whistler waves. The burst duration ranges from a few to 10 seconds. The waves
have a typical wave length of about 1 electron inertial length (20 km). The strongest
burst is observed right before the magnetic field curvature peaks negatively and then
reverses sign. The curvature reversal coincides with ion flow reversal, and is inter-
preted as due to the traversal of the reconnection X-region by the spacecraft. The
strongest whistler burst occurs in association with the enhancement of energetic
electrons up to 100 keV, and with a strong electron temperature anisotropy. We ex-
probe the possibility of inferring information about the reconnection dynamics and
the stability of thin current sheets from these wave characteristics.

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