Multi-satellite observations of Low Frequency bursts (2)

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Low frequency (LF) busts, also called isotropic terrestrial kilometric radiation (ITKR), are found in 1988. Their frequencies are between 30 and 100 kHz and often associated with auroral kilometric radiation (AKR). The lowest frequency of AKR sometimes becomes 30 kHz and AKR is spin modulated. On the other hand, LF bursts are not spin modulated and isotropic. The present paper compares intensities of LF bursts observed by Geotail, POLAR, and WIND satellites in order to examine their source and propagation mechanisms.

Low frequency (LF) busts, also called isotropic terrestrial kilometric radiation (ITKR), are found by Steinberg et al. [1] in 1988. Their frequencies are between 30 and 100 kHz and often associated with auroral kilometric radiation (AKR). LF bursts are not spin modulated and isotropic. Steinberg et al.[2] proposed that they are back scattered in the interplanetary (IP) medium far down the tail magnetosheath and lobes ducted after radiation is emitted near the Earth. We compare intensities of LF bursts observed by Geotail, POLAR, and WIND satellites in order to examine their source and propagation mechanisms. Geotaoil was mostly just outside of the magnetosphere. Polar sometimes observes AKR near the source region. WIND was in the solar wind between the earth and the sun mostly at more than 200 Re. Their positions are very convenient to compare intesities at various points.

The intensity comparisons of LF bursts among multiple satellites indicate that their intensities are quite similar in the solar wind (outside the magnetosphere). They are stronger inside the magnetosphere. These characteristics are quite different from AKR, which can pass through the magnetosphere and whose intensities depend on the distance from the earth. The present observations are consistent with the hyposesis [2]. Further analyses are necessary to identify the source.

[1] J.-L. Steinberg, C. Lacombe, and S. Hoang, A new component of terrestrial radio emission observed from ISEE-3 and ISEE-1 in the solar wind, Geophys. Res. Lett., vol. 15, no. 2, pp. 176-179, 1988.

[2] J.-L. Steinberg, S. Hoang, and J.-M. Bosqued, Isotropic terrestrial kilometric radiation: A new component of the Earth's radio emission, Annals Geophysicae, vol. 8, no. 10, pp. 671-686, 1990.