Estimation of Ionospheric Exit Region of VLF Waves Including Earth-inosphere Waveguide Effect

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The multiple signal classification (MUSIC) method is modified to include the Earth-ionosphere waveguide, and examined by computer simulations to estimate the ionospheric exit regions of the magnetospheric ELF/VLF waves. This modification improves the unlikely estimation that the ionospheric exit regions are frequently located close to the zenith of the observing point by conventional ground-based direction findings such as the wave distribution function method.

The MUSIC method is also applied to the VLF hiss observed at Halley Bay station, Antarctica, 1986 May 1, as an example. An local maximum that shows the arrival of the waves can be found in the evaluation function when a proper number of the multiple waves are taken into consideration.