

あらせ衛星で受信された Kilometric Continuum (速報)

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Kilometric Continuum observed by the ARASE satellite (preliminary report)

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Kilometric continuum (KC) is a wave phenomenon identified by the GEOTAIL satellite [1]. This is a kind of escaping continuum whose upper frequency is close to the maximum frequency of its SFA (sweep frequency receiver). The upper frequency is also 800 kHz in the IMAGE satellite receiver which can observe up to 3 MHz [2]. The most typical feature is the geomagnetic latitude dependence of the reception probability. The probability is highest near the equator. The source of KC is believed to be in the equatorial region. The maximum plasma frequency is the plasmopause is around 200 kHz. The frequencies of KC are higher than the maximum frequency. This point is different from the characteristics of the conventional continuum. The IMAGE satellite found that the source is in notch where the electron density is depleted near the equatorial plasma pause. Many other satellites such as INTERBALL-1 [4], POLAR [5], CRES [6], reported KC observations.

Although we tried to observe KC by the SELENE (Kaguya), KC was not observed since its intensity is lower than the noise level. Since the Arase satellite launched in the last December observes KC, we report the preliminary results on the KC observations. The IMAGE satellite which found the source of KC is in a polar orbit. The Arase satellite's inclination is about 32 degrees. Its apogee and perigee are about 32,000 km and 440 km, respectively. This is convenient for observations near the source region.

References

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Kilometric continuum (KC) は Geotail 衛星で見つけられた波動 [1] で、SFA 掃引受信器の 800 kHz の観測上限周波数まで受信され周波数範囲は AKR と同様であるが、escaping continuum の一種である。3MHz まで受信可能な IMAGE 衛星においても上限周波数は、800kHz であった [2]。最も特徴的な特性は、その受信確率の磁気緯度依存性である。赤道近傍で受信される確率が高く、緯度が高くなるにつれ低くなる。このことから、KC の源は赤道域であり、通常の continuum と同様にプラズマポーズなどの電子密度分布の勾配が急なところで、電波の周波数とプラズマ周波数が等しいところ考えられている。しかし、プラズマポーズの最高プラズマ周波数は 200kHz 程度で、KC の周波数は一般にそれよりも高く、通常の continuum とは性格が異なると考えられる点が興味深い。IMAGE [3] では、notch (bite-out) と呼ばれるプラズマポーズ近傍の赤道で電子密度分布の急減する領域が低高度になった (窪んだ) ところが KC の源であることを発見した。その他、INTERBALL-1 [4], POLAR [5], CRRES [6] などの衛星での観測が報告されている。詳しくは review [7] が出ている。

月周回衛星かぐやでの観測を試みたが、KC は雑音レベル以下であったため、AKR しか受からなかった。昨年末に打ち上げられたあらせ衛星では KC が受信されている。KC の源を発見した IMAGE 衛星は極軌道であった。あらせ衛星は近地点約 440km, 遠地点約 32,000km, 軌道傾斜角約 32 度なので、源近傍での観測も期待される。まずは受信状況を調べることにした。

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