

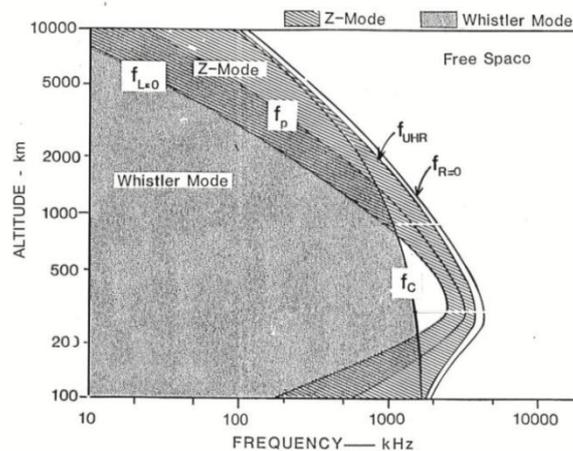
Response to the Referees

Kilometric wave emission observed on pre-midnight side in the vicinity of the Earth's magnetic equatorial plane at 1-2 L-Shell

First of all, we thank both reviewers for their constructive comments and suggestions. In the title, we have written 'Kilometric wave emission' instead of 'terrestrial kilometric radiation', and indicated where DEMETER detected such radiation. In the upgraded version we have re-considered and re-written essentially the Section 3 taking into consideration the reviewer comments. It is evident that the confusions between DEMETER kilometric wave emission and the terrestrial kilometric radiation are due to three main reasons: spectral beam, i.e. 'Christ tree', are similar, the parallel bands and the beaming around the magnetic equatorial plane. In the discussions Section, i.e. Section 3, we have summarized the main results and insisted on one side, on the spectral features of the kilometric wave emissions and on the other side on the similarities and the discrepancies between the DEMETER kilometric emission and the terrestrial kilometric radiation. The Z-mode is considered as a generation mechanism candidate. Our responses to referee are listed below.

Response to Referee #2

Reviewer2: This paper reports observation of LF waves which might be generated at the plasmopause and propagate to the low-altitude equatorial region. The observation results are interesting and raised some important problems of propagation characteristics of the LF waves in the plasmasphere. I have some comments on the paper.



R2_A: 1. In the manuscript, the authors do not mention an important point, that is, the observed LF waves by DEMETER are "whistler mode waves". I attached a diagram (drawn by myself) which shows the characteristic wave-mode in the frequency range of 10 kHz-2 MHz in the altitude range of 100-10000km. It is obvious that the ICE/DEMETER instrument can detect only the whistler mode waves within the observation frequency range up to 3.5 MHz at the altitude of DEMETER (about 700km). Thus, the observed waves by DEMETER are not free-space mode but R-X mode of whistler waves trapped in the plasmasphere. When the authors consider the LF wave propagation from the

source region near the plasmopause to the low-altitude equatorial region, they should take into account the propagation characteristic of whistler mode waves with respect to the magnetic field.

A2_A: We agree with the referee suggestion concerning the whistler mode waves as a physical process at the origin of this emission. The attached diagram, provided by the referee, leads to explain the observed frequencies and their corresponding altitudes. In the upgraded version, we report about new references concerning whistler mode waves and particularly the Z-mode which may be observed in the vicinity of the magnetic equatorial plane.

2_B: 2. I recommend considering the mode conversion of original radiations, which are probably Z-mode or upper hybrid mode radiation generated around the plasmopause, to whistler mode waves. And the observed kilometric radiation at DEMETER can be whistler mode wave. However, in this case, it becomes difficult and needs some suitable idea to interpret the "beam pattern" derived from the authors' study, because the whistler mode wave tends to propagate along the magnetic field. This is the interesting point that authors raised.

A2_B: We did not change too much in the content of the Section 2 when it is compared to the previous one. We have mainly derived the observational parameters particularly the variation of the power level versus the frequency and the magnetic latitude. In Section 3, we have attempted to explain the similarities and the discrepancies between the DEMETER kilometric emission and the well-known terrestrial kilometric radiations.

R2_C: 3. In the text, the authors say that the type1 is trapped component and the type2 is escaping component. What is the reason? Usually, the term of trapping/escaping is used in the case of free-space mode propagation in the magnetosphere.

A2_C: It is clear from the dynamic spectrum of kilometric wave emission that we deal with two components. The spectral shapes, as shown in Fig.5, are found to be similar to those associated to the terrestrial kilometric emission. For this reason we have considered the trapped (Type 1) and escaping (Type 2) emission taking into consideration the frequency boundaries around 50 kHz. Such spectral patterns are addressed and discussed in Section 3.

R2_D: 4. The authors distinguished two varieties of emission: "Type 1 appears as a narrow continuum with an instantaneous bandwidth of about 2 kHz at frequencies less than 50 kHz, and displays negative and positive frequency drifts when the satellite is approaching or leaving the equatorial plane, respectively. Its frequency drift rate is weak and in the order of 0.2 kHz/s. Type 2 is composed of parallel narrow-bands in a frequency above 50 kHz and up to 800 kHz." I agree the presence of Type1 and Type 2 radiations, but do not agree to use mixed data of Type1 and Type2 in the analysis of figures 2-6. I suggest that they should be separately analyzed, because the different characteristics of type1 and 2 suggest the different source mechanism and/or different propagation pass.

A2_D: In the upgraded version, we have described both types of emissions. However, we don't consider them as trapped and escaping emissions. We have attempted to insist on the source regions of both components as discussed in Section 3. Further surveys of ICE observations may allow a better characterization of each component by considering a longer period of investigations, at least one year.

R2_E: 5. The authors found structured emissions in the LF waves, and classified into two categories: "In the northern hemisphere, five components in the frequency ranges of few kHz - 50 kHz, 70 kHz - 130 kHz, 170 kHz - 250 kHz, 280 kHz -340 kHz and 380 kHz- 420 kHz. In the southern hemisphere, four components in the frequency bands: of 200 kHz - 320 kHz, 320 kHz - 450 kHz, 450 kHz - 570 kHz, and 570 kHz - 670 kHz." The reader will imagine that these bands are showing the higher harmonic relation. In fact, as shown in Figure 1, an individual event shows fine harmonics. And, one can easily infer the fundamental frequency from the harmonic relation, and then can suppose the source altitude of the emission assuming the distribution of gyrofrequency and plasma frequency. I suggest to add discussion on this matter in the text.

A2_E: In Section 3, we have suggested the probable source regions of the kilometric wave emissions as a micro-scale region in the inner plasmasphere. In the new Fig.9, we have attempted to display how the Z-mode frequency is delimiting the source altitude.

R2_F: 6. minor comments: *p1, line17 seventeens should be seventies, *p2, line 13 plasmasphere should be magnetosphere. *Fig 6 vertical axis is wrong. * Unpublished paper should not be included in References.

A2_F: Minor comments are considered in the upgraded version. Unpublished references (i.e. Boudjada et al., EGU09 & Boudjada et al., EGU14) have been deleted from the text and the reference list.