

昭和基地—アイスランド地磁気脈動データベースの開発と Pc1 パール解析への応用

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Development of Syowa-Iceland ULF spectrogram database and some applications to Pc1 pearl analysis

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We have developed ULF spectrogram database for conjugate induction magnetometer observations at Syowa Station, Antarctica and three Icelandic stations, Aedeý, Tjornes and Husafell. The archived data cover time periods of 2003-2012 for Syowa, 2003-2008 for Aedeý, 2003-2009 for Tjornes, and 2003-2012 for Husafell, almost covering one solar cycle of 11 years. The spectrogram has frequency full-scale of 1 Hz with two different time scales of 24 hours (time resolution: 2 min; frequency resolution: 0.004 Hz, see Fig.1) and 1 hour (time resolution: 10 s; frequency resolution: 0.06 Hz). The latter spectrogram is useful to find out Pc1 pearl structures with periods of about 40 s ~ 3 min. Some of the Pc1 pearls show alternate appearance at the conjugate point (Fig.2) and they are considered to be caused by the bouncing of Alfvén wave packets between two hemispheres (Kenney and Knaflich, 1967). However, a contradicting model is proposed that MHD waves of upstream origin in Pc3-4 range modify the growth rate of EMIC waves in the magnetic equatorial plane and they propagate down to the polar region and observed as Pc1 pearls (Rasinkangas and Mursula, 1998, Mursula et al., 2001). We hope that our long-term data base of conjugate ULF spectrogram will give an experimental proof and explanation to this controversial issue.

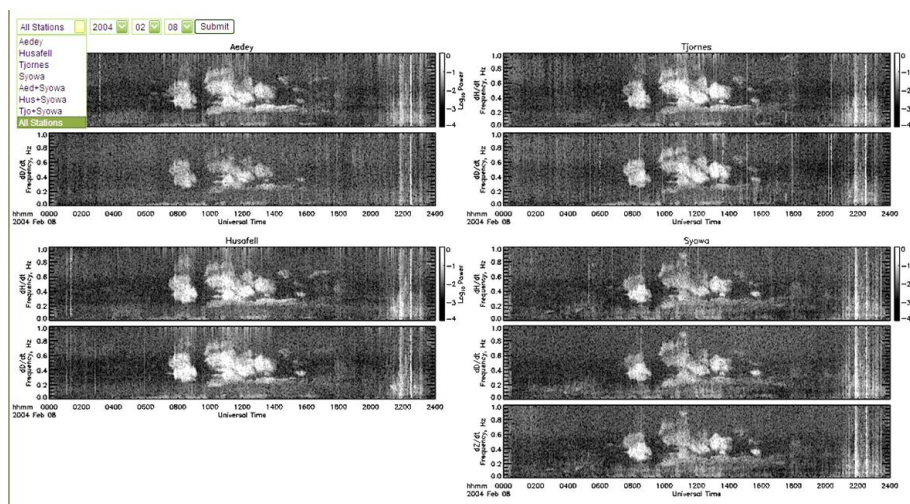


Fig. 1 Spectrogram of ULF waves observed at Icelandic 3 stations and at Syowa.

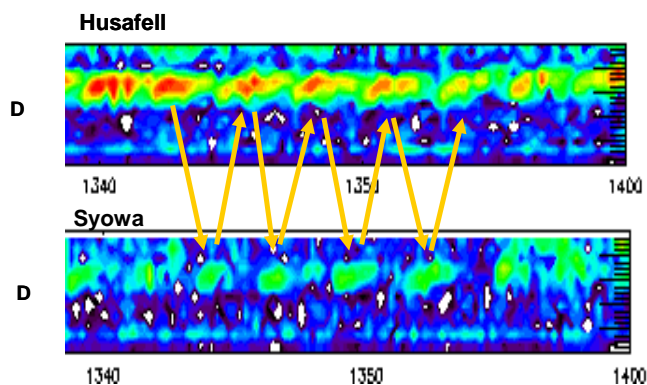


Fig. 2 Pc1 pearls observed alternately at the conjugate point, Husafell and Syowa on Nov. 8, 2003.

References

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