

Occurrence characteristics of Es structured by obtained using HF Doppler observations during 2008

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http://ssro.ee.uec.ac.jp/lab_tomi/index_j.html

It is already known that Es can be categorized into two, structured due to scale size of measurement Fresnel zone. In this study, we focused on Es with the structure because Es with the structure has the wave front structure we have modeled Es refraction from structures smaller than the Fresnel zone when Es with the structure moves along the observation baseline. This refraction shows a symmetrical shape. Doppler shift around the midpoint. Es with the structure can be identified in this way, assuming that it moves along the direction into same speed. The time when Es passes the middle point, the Doppler shift becomes 0Hz, and the shape depends on the speed. Movement of Es frontal structure can be derived in terms of delay times at multi stations. This method gives the same information as Shinno's LORAN-A experiments[2]. As for HFD, the decision of the time when Es pass the middle point is easily identified as Doppler shift of 0Hz since the crossing straight shape with zero baseline is clear. The structured Es occurrence in night time clearly shows that the structure Es appeared in daytime. It is explained by becomes the maximum in summer, which agrees with Shinno's result. However, it absorptionally D layer, in daytime. The speed and the direction of Es were derived from Doppler shift that happened when Es with the structure passed the point of reflection of HF. The change in the generation ratio of Es with the structure for one year of 2008 to foEs was derived, and Es with the structure in of each day and night was compared with the value of foEs. In this study, because of the time change of Doppler shift in about 0Hz to the straight line, the integration value in this straight line was requested from being able the approximation and the Es extraction with the structure was assumed to be Es with the structure more than constancy it. First of all, the foEs dependency of the Es generation with the structure was examined. When the generation ratio of Es with the structure increases when foEs rises, and 20MHz is exceeded, it has been understood it has the structure without fail. In the Es generation frequency with the structure, it had foEs in daytime and a good correlation, it was generated on average between seven o'clock and 13 o'clock, and the incidence showed a low feature in the afternoon though foEs was high.

On the other hand, the dependency understood two showed a very good agreement as a result of Shinno's, and there was no difference according to the observation frequency at the provinces time of the Es generation frequency with the structure at nighttime. The seasonality of the Es generation frequency with the structure at nighttime has the possibility of the relation to no possession of a clear structure from no result of Shin'no et al. agreement with two by Es at nighttime. It is necessary to analyze HFD for the long term, and to compare this respect in detail with foEs.