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Characteristics of structured-Es movement observed by HF Doppler.

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We have already shown that Es can be categorized into two, large or small, compared with the scale size of the first Fresnel zone. Then, we called the small Es as The structured Es (SEs), and presented that most of SEs have wave front a structures with small width, which cause liner Doppler shift whenever drifting. Using these characteristics we have discriminated SEs from flat ones, and have presented the SEs having two peaks around 8 and 20 hours in JST[2].
Based on the model of SEs movement and HF reflection, we have shown that the velocity and direction of Es movement can be obtained by the characteristic rate of Doppler shift and the zero crossing time. Then we have developed a method to estimate the actual SEs frontal movement by using multi point observations. By using the observations of in 2009 four status Sugadaira, Kashima, Oarai, and Kiso, we have shown that the occurrence of SEs indicates the peaks at 9 and 18 hours in JST, corresponding speeds of 80m/s and 100m/s, respectively which can be interpreted that SEs shows sunrise and sunset effects.
The directions of SEs movement, has the maximum occurrences at 235 degrees from the north in clockwise in night time. This result coincide with the model of Tsunoda et.al[3]. On the other hand, in daytime SEs has maxima at 120 degree and 180degree, which may indicate that SEs can be derived by a different mecanism.
In this analysis we have assumed a long-liner frontal structure, then the above different results only indicates the characteristic the large scale structure of SEs having a strict plane wave. It can be interpreted that the curvature of SEs front may be influenced by the selection of the observation points.So, more detailed analyses are requiring investigating the characteristic of SEs movement

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