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The use of interferometer technique implemented in a VHF coherent scatter radar with relatively broad antenna beam pattern in the azimuth direction makes it possible to reveal zonal drift velocity of 3-meter field-aligned irregularities (FAIs) inside a moving plasma structure at kilometer scale. In this article, we find for the first time the systematic difference in the zonal drift velocities of the 3-m FAIs between layer-type and clump-type plasma structures in sporadic E (Es) region. There is an evident tendency for the 3-m FAIs in the layer-type plasma structure to drift in the same zonal direction as the moving plasma structure. However, the correlation between the drift velocity of the 3-m FAIs and the moving direction of the large scale plasma structure is indistinct for the clump-type plasma structure. The meridioal electric field estimated from the 3-m FAI zonal drift velocity is pointed in the northward/upward (southward/downward) direction for the layer-type plasma structure moving in the west (east) direction. Statistical results show that the mean value of the meridional electric field inside the layer-type plasma structure is approximately 2.7-2.8 mV/m, about 3 times larger than that for the clump-type plasma structure. Physical processes responsible for the formations of the layer-type and clump-type plasma structures are discussed in this article. It is believed that neutral wind shear is very likely the main cause of the layer-type plasma structure formation, while the clump-type plasma structure may be associated with the propagating gravity wave.

キーワード: 3-m field-aligned irregularities, Es plasma structure, zonal drift velocity, neutral wind shear, gravity wave, interferometer method
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