NONLINEAR EVOLUTION OF E REGION PLASMA WAVES AND THEIR CONSEQUENCES.

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Using a recent intermittency formulation of E region irregularity theory we argue that Farley-Buneman waves break down into blobs and holes to produce echoes that behave the same as if the structures were elliptical hard targets moving at the ion-acoustic speed in a direction that is rotated away from the electron $\mathbf{E} \times \mathbf{B}$ drift direction. This description explains qualitatively why the spectral width is smallest and the power greater in the direction where the phase velocity is greatest. At high latitudes, however, the rotation is limited by the necessary growth of large aspect angles in the later stages of evolution of the structures. The growth of nonzero aspect angles has several consequences. For one thing, it leads to electron heating by the wave fields. Other interesting consequences are found when ambient and/or gradient-drift induced gradients are affecting the growth of 1- to 10-m size structures: for example, when gradients are unfavorable to growth, the growth phase undergoes two separate stages of evolution while a sudden change in the threshold speed is taking place. By contrast, when extending this idea to low latitudes, we find that the nonlinear growth of large aspect angles does not have to take place. This means that, even when not considering the nonlocal effects due to altitude variations, blobs and holes that evolve from large scale gradient-drift waves can undergo very large rotations, with furthermore a very clear contrast between holes and blobs electric fields and densities. This in turn introduces pronounced asymmetries in type I irregularities, particularly when conditions are extreme enough to cause type I irregularities to be seen along the vertical.

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2. H - Waves in Plasma

3. (a)

4. I - Invited Paper, Program chair: Meers Oppenheim

5. No special instructions