

Radar echo production and co-movement with winds implying intense electric polarization fields production and propagation along Bo in the Antarctic.

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We find that radar echoes are produced by atmospheric turbulence in the presence of the vertical gradient along heights of the radio refractive index (RRI) consisting of the air, humidity and electrons moving along the RRI gradient in the Antarctic atmosphere. RRI perturbations are caused by turbulence produced upon the gravity wave saturation. It is found that if the RRI perturbation velocity is divergence-less, the perturbation co-moves with turbulence which co-moves with local winds. The divergence-less RRI perturbation motion in the troposphere as well as lower stratosphere is well understood since the atmosphere turbulence is well known to be divergence-less. But even in the upper stratosphere and mesosphere where electrons are the main RRI constituent, the RRI perturbation motion can be divergence-less because intense electrical polarization fields are set up by small scale turbulence, releasing electrons from Bo control. Such intense electric field can play a role as possibly producing certain conjugate TIDs.