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Direct comparison of sporadic E from COSMIC-2 radio occultation and vertical wind shears from ICON/MIGHTI

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The formation of a sporadic-E (Es) layer at mid and low latitudes is generally attributed to the vertical wind shear, which is predicted to cause vertical ion convergence. According to wind shear theory, a negative shear of the eastward wind is effective in converging metallic ions into a thin layer to produce Es. However, the direct comparison of Es with the local wind shear has been limited due to the lack of neutral wind measurements. This study examines the role of the vertical wind shear for Es, using signal-to-noise ratio profiles from COSMIC-2 radio occultation measurements and concurrent measurements of neutral wind profiles from the Ionospheric Connection Explorer (ICON). We find that the Es occurrence rate is correlated with the negative vertical shear of the eastward wind, providing observational support for the wind shear theory.