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Statistical properties of nonlinear wave signatures in OH and O2 airglow brightness data observed at lower midlatitudes

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Among more than 2200 nights of mesopause region airglow observations at lower midlatitude sites, mainly from El Leoncito (32S, 69W), about 130 show considerable airglow brightness changes within a short time span (4 min to one hour) that are strikingly different from normal gravity wave signatures and probably related to nonlinear waves. Although the number of cases observed in different years varies widely, some regular occurrence patterns can be identified. Most of the events affect the OH emission layer, while only about one fourth is limited to the O2 emission (at the higher altitude of 95 km). The seasonal distribution of nights exhibiting such events clearly shows a winter
maximum centered around solstice. About 70% of the cases visible in OH only (that is, at about 87 km) occur between May and August, and very few (if any), in March or September.