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Characteristics of ionospheric flux rope at the terminator observed by Venus Express

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The flux rope refers to the magnetic topology characterized by relatively strong axial fields near the center and weaker, more azimuthal fields towards the outer edge. While previous works about the flux ropes in the Venusian ionosphere using PVO observations are mainly in the subsolar region, the Venus Express, owing to its different orbit, provides us the opportunity to restudy the flux ropes at the terminator region in the ionosphere of Venus. In this study, we implemented a statistical work to investigate the characteristics of the magnetic flux rope observed by Venus Express (at the terminator region) during solar maximum and compared them with the characteristics of the flux rope surveyed by PVO (in the subsolar region). The results present as following: (1) The flux ropes in the terminator region have a lower spatial occurrence compared with those in the subsolar region, and the spatial occurrence of the flux ropes is also getting smaller when altitude increases; (2) The scale size of the flux rope is larger in the terminator region than that in the subsoalr region and becomes larger when altitude increases; (3) In the terminator region, the flux rope appears to have a quasi-horizontal orientation but with some cases can be vertical at low altitude; (4) The flux ropes in high solar zenith angle regions are confirmed to have a lower helicity compared with those in low solar zenith angle regions.