

## Concentric structures in molecular oxygen emission observed by ISS-IMAP/VISI

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Concentric structures in airglow emissions were often observed from ground based imagers. Some of them were thought to be caused by the active clouds in the troposphere. It was not able to observe the overall structures from the imagers on the ground under the cloudy condition. Field of views of the imagers were not enough to observe whole structure. Space borne imagers are able to observe the structures caused by the disturbances in the lower atmosphere with wider field of view. Concentric structures of the O<sub>2</sub> airglow emission in 762-nm wavelength were found by the Visible and near-infrared imager on the International Space Station on June 1, 2013 over the U. S. This is the first case which took the image from edge to the center of the concentric structure. Spatial scale of this concentric structures were estimated to be 1,200 km. Fine structures with 80 km wavelength and no dumping in the intensity were observed in this VISI observation. Amplitude in these fine structures were about 10 % to the background intensity. Circular structures were also observed in the GPS-TEC observations before the VISI observation. These concentric structures were estimated to be caused from the active clouds after tornado and atmospheric gravity waves had propagated in horizontal direction in the emission layer.

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