Global distribution of the mesospheric O$_2$ airglow from the ISS-IMAP/VISI measurements


The visible-light and infrared spectrum imager (VISI) has made imaging measurements of the molecular oxygen nightglow in the mesopause region (~95 km) from the international space station as the ISS-IMAP mission. The emissions of the O$_2$ atmospheric bands are mainly produced by the recombination of the atomic oxygen. The atomic oxygen plays important roles in variations of plasma density profile and chemical reactions in the mesosphere, thermosphere, and ionosphere (MTI). On the other hand, the motion of the atomic oxygen layer is strongly modulated by atmospheric waves, such as tides and gravity waves. So, the O$_2$ airglow, especially its global view, is useful to deduce atmospheric compositions in the upper atmosphere and can monitor of dynamical coupling process between the lower atmosphere and MTI. Though a couple of previous papers report global distributions of the O$_2$ airglow from satellite remote-sensing techniques, it still leaves room for further studies. The VISI observations allow us to know a longterm variation of the global O$_2$ airglow with an exceptionally high spatial resolution imaging.

In the presentation, we will report a statistical view of the VISI O$_2$ airglow measurements since September 2012 (62-days in the winter months). The O$_2$ brightness show a strong hemispheric asymmetry, brighter (darker) in the southern (northern) hemisphere, and longitudinal variations in the midlatitude.