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Atmospheric temperature in the Venus mesosphere, investigated by VIRTIS/Venus Express

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Atmospheric temperature, retrieved using remote sensing data acquired with the VIRTIS (Visible and Infrared Thermal Imaging Spectrometer) instrument on board the European Venus Express mission, is presented for the night side of Venus both in the northern and southern hemispheres of the planet. The explored pressure range covers from 100 to 4 mbar, corresponding approximately to the altitude range from 65 to 80 km. Differences between the dusk and dawn sides are observed in the temperature values, the dawn being the coldest quadrant in the pressure range 100 to 12 mbar. The most important observed feature is the cold-collar region around 60-70°, which is 15 to 20 K colder than the temperature at the pole at 100 mbar (about 65 km), also showing a significant thermal inversion. A peculiar pattern of maxima and minima in temperature is observed at 100 and 12 mbar. The application of a global circulation model (Lebonnois et al., 2010) to our data allows to interpret the observed features as indication of diurnal and/or semidiurnal thermal tides (Migliorini et al., 2011).