CONTROL ID: 2566506

TITLE: Atmosperic Science with VEM on board *Veritas*

ABSTRACT BODY:
Abstract (2,250 Maximum Characters):
Thermal brightness on Venus' night side is mainly modulated by the lower cloud layer extending from about 45 to 60 km in altitude, the most recent observations being the outstanding 2.3 µm images recorded by the IR2 camera onboard *Akatsuki* [Gibney, 2016]. The VEM multispectral imager (P.I.: J. Helbrt, DLR) onboard the proposed NASA *VERITAS* orbiter (P.I.: S. Smrekar, JPL) has the capability to observe these lower clouds. The VEM filter bands at 1.195, 1.310 and 1.510 µm will acquire very accurate images of the clouds: resolution in Phase II orbit after spatial binning will be about 20 km, which is close to the atmospheric blurring limit. This will lead to the acquisition of a large data set that allows for the study of the lower cloud morphology and climatology with good coverage in latitude, planetocentric longitude and local solar time.

On the other hand, variations in the ratios of these three bands would help in constraining changes in composition, altitude and/or size distribution of the lower cloud particles [Barstow et al., 2012; Haus et al., 2014, 2015]. Such observations at small horizontal scales would be of great importance to microphysical models of Venus' clouds and haze system [McGouldrick et al., 2007]. Previous (*Venus Express*) or present (*Akatsuki*) observations of the lower clouds have proven the validity of these methods, but VEM onboard *VERITAS* will give an unprecedented coverage of the lower cloud horizontal structure on scales between 20 and 200 km in terms of spatial and temporal sampling, wavelength stability and signal-to-noise ratio.

Tracking lower cloud motions as a proxy for wind measurements at a high spatial resolution would also be of great interest to mesoscale and general circulation models. Such a study is made challenging due to the fast zonal super-rotation so that clouds that are visible in the field of view usually cannot be observed 90 min later when *VERITAS* flies over the same region in its next orbit. However, the super-rotation breaks down for latitudes higher than 80°, so that cloud tracking would be possible in both north and south polar dipoles [Piccioni et al., 2007] well known for their complex and ever-changing dynamics.

CURRENT * CATEGORY: Venus

CURRENT : None

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