

Space Studies of the Upper Atmospheres of the Earth and Planets including Reference Atmospheres (C)

Venus Express: Two Years of Observations (C33)

THE STRUCTURE OF VENUS' UPPER ATMOSPHERE AND FORTHCOMING MEASUREMENTS BY THE VENUS EXPRESS ATMOSPHERIC DRAG EXPERIMENT

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A rich set of measurements of Venus' atmosphere above the top cloud layer (around 60-250 km) was provided by the Pioneer Venus mission between 1978 and 1992, with additional data from Radio Science and atmospheric drag measurements by the Magellan spacecraft. Some of these measurements were summarized in empirical models by Hedin et al. (1983) and Keating et al. (1985). These models have been used extensively for scientific and engineering purposes. One considerable shortcoming of these models has however been the lack of constraints at high latitudes and low solar activity. Venus Express is offering us a unique opportunity to fill this gap, given the orbital geometry that allows observations at high latitudes and the current solar minimum.

We are presenting a new experiment, the Venus Express Atmospheric Drag Experiment (VEx-ADE) which uses two separate techniques to investigate atmospheric structure. Initial lowering of periapsis of Venus Express to around 180 km, as planned for mid-2008, should allow examining atmospheric effects on orbital decay. We expect to be able to obtain densities at periapsis altitude from several successive orbits and, with time, to build up vertical density profiles in the thermosphere at high latitudes and solar minimum, the first ever measurements for Venus at those locations and conditions. At later stages in the mission periapsis may be lowered even further, allowing potentially to use a second technique of determining densities, by ana-

lyzing the atmospheric drag from the on-board accelerometers used otherwise for engineering purposes.

This talk will present our planned measurements and outline the scientific case for this experiment, presenting an assessment of our current knowledge of the atmospheric structure on Venus above 60 km altitude.