

First Ozone Campaign Over the UAE Using Balloon-Borne ECC Soundings

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The first ever campaign of observing vertical profiles of ozone over the UAE began on January 24, 2006 with a couple of balloon flights carrying ECC ozonesondes. This campaign has been scheduled for a period of one year to study characteristics of the chemical and dynamical structures at this unique tropical location (latitude 24.45N; longitude 54.22E). Using the Vaisala technique along with the ECC ozonesondes, we plan to launch three to four balloon flights each season to observe changes in concentration of ozone up to the stratospheric heights. In this paper, we present the first ozone profiles throughout the troposphere and the stratosphere characterizing the wet (January - March) and dry (April - June) seasons over the UAE. Preliminary results of January profiles indicate that the stratospheric ozone is quite stable while thick polluted layers confined to the lower tropospheric heights show enhancements in ozone contents. Excessive values of ozone concentration in the range 50 - 55 ppb at the ground levels are observed. These values are 20 to 30% larger than those observed at nearby sounding stations like New Delhi (India) and Esfahan (Iran) using the same technique. The difference in values probably reflects the elevated levels of pollution due to petrochemicals and automobile emissions in the UAE. A model analysis of ozone profiles is currently in progress utilizing our coupled global transport and photochemistry model. The tropopause, which delineates the different mixing properties of the tropospheric and stratospheric reservoirs, is not a sharply defined layer but rather a transition layer with a marked change in vertical stability and a significant increase in ozone. Thus the transition zone between the vertically stratified lower stratosphere, where ozone gradients are very sharp, and the troposphere within which ozone is relative well mixed, is varied from season to season at tropical latitudes. We intend to present all the ECC sounding data and their model analysis available by that time including a discussion on the high levels of surface ozone responsible for contaminating the air quality in the UAE. This work is supported by the Office of Presidential Affairs, Abu Dhabi, UAE