



An Ozone Study with Balloon-Borne ECC Soundings over the UAE: Analysis with a Global Environmental Multi-scale Model

T. Majeed (1), A. Sajwani (1), D. W. Tarasick (2), J. Davies (2), M.A. H. Al-Mualla (3), M. Lootah (1), J. Kaminski (4), L. Neary (4), and J. C. McConnell (4)

(1) American University of Sharjah, UAE, (2) Environment Canada, Toronto, Canada, (3) The UAE meteorological Department, Abu Dhabi, UAE, (4) York University, North York, Canada

The first ever campaign of observing vertical profiles of ozone over the UAE started on January 24, 2006 with a couple of balloon flights carrying ECC ozonesondes. Using the Vaisala technique along with the ECC ozonesondes, we launched three to four balloon flights each season to study characteristics of the chemical and dynamical structures at this unique subtropical location (latitude 24.45N; longitude 54.22E). 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 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 - 140 ppb at the ground levels are observed. These values are 20 to 40% larger than those observed at nearby sounding stations like New Delhi (India) and Esfahan (Iran) using the same technique. 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 relatively 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 which contaminate the air quality in the UAE.