

Behavior of Some TC-4 Atmospheric Parameters Measured by Balloonsondes and NASA Aircraft

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The Laboratory of Atmospheric Physics of the University of Panama collaborated with NASA TC-4 field campaign during July and August, 2007. To study the profiles of some atmospheric parameters, balloonsondes were launched twice daily from San José, Costa Rica and Las Tablas, Panama. One of these parameters is relative humidity whose daily vertical structure is associated with tropical deep convection. Relative humidity behavior through upper troposphere and lower stratosphere is very important in order to assess the contribution of water vapor to climate change, since water vapor is the most powerful greenhouse gas. Relative humidity, temperature and ozone profiles obtained from data collected with sondes launched from Panama and Costa Rica, during TC-4, are analyzed. Relative humidity profiles show inversion layers near 550 mb which are linked with deep convection processes occurred previously. Radiative forcing from maritime anvil cirrus plays an important role in the modulation of climate change, since these clouds have a cooling effect as a consequence of scattering incoming sunlight by cirrus ice crystals. But these clouds also have a warming effect due to the fact that they absorb upwelling thermal infrared radiation emitted from the surface. During TC-4, several coordinated flights of ER-2 (over the cirrus layer) and DC-8 aircraft (below the cirrus layer) were planned. A discussion of the incoming solar radiation budget as well as the thermal infrared radiation budget measured during the coordinated flights occurred on August 6, 2007, will be presented.

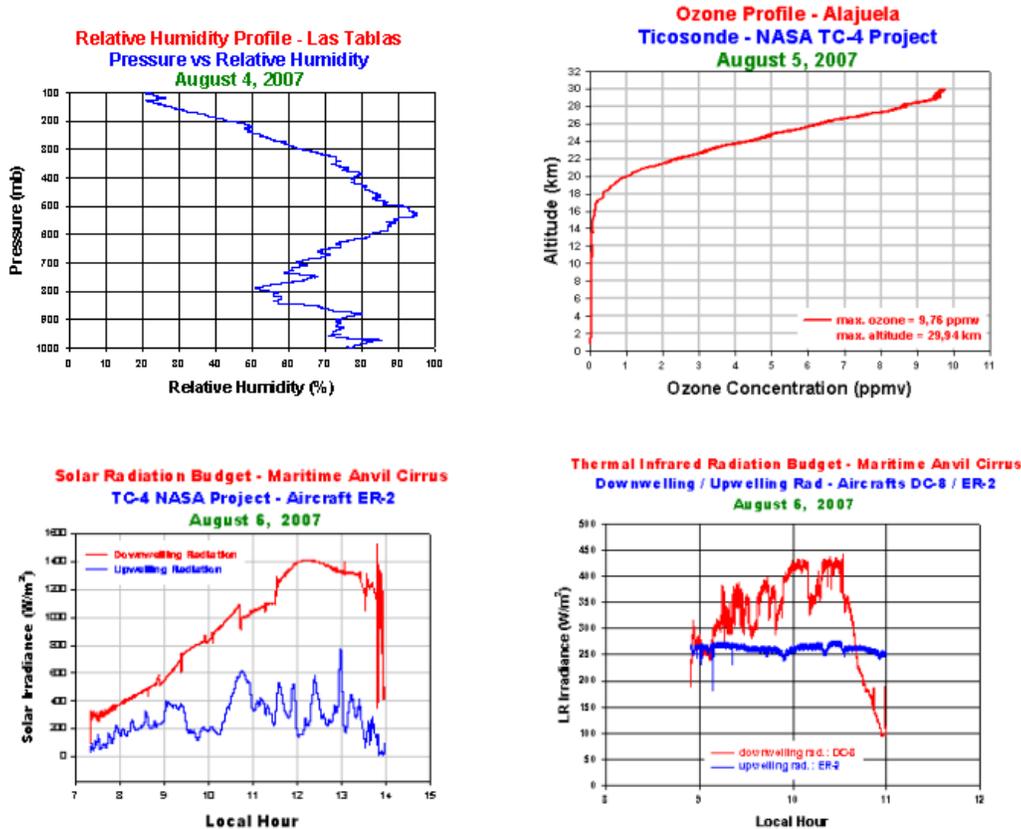


Figure 1. a) Relative humidity profile (Las Tablas). b) Ozone Profile (Alajuela). c) Solar Radiation Budget (Maritime Anvil Cirrus). d) Thermal infrared radiation budget (Maritime Anvil Cirrus).