Ticosonde/TC^4 2007

Ticosonde/TC^4 is an international collaborative campaign of meteorological balloon measurements that will take place from June to August 2007 in support of the NASA Tropical Composition, Clouds and Climate Coupling (TC^4) experiment based at Juan Santamaria International Airport, Alajuela, Costa Rica. Ticosonde/ TC^4 consists of two simultaneous launch programs: ascents up to four-times daily of Vaisala RS92-SGP radiosondes, and approximately 20 ascents of a combined cryogenic frostpoint hygrometer (CFH) and ozonesonde payload over course of the 3-1/2-week TC^4 airborne campaign beginning in mid July.

The Ticosonde/ TC^4 measurements of water vapor, ozone, temperature and winds will be used for validation of Aura and other "A-train" satellite measurements as well support of the TC^4 aircraft measurements and flight planning. In addition, the Ticosonde/TC^4 project seeks to use the unique vantage point afforded by the combination of high-frequency radiosonde measurements with regular tropical water vapor and ozone profiles to investigate the complex of dynamical and convective processes in the tropical tropopause layer (TTL) from high-frequency gravity waves out to intraseasonal phenomena such as the Madden-Julian oscillation. Significantly, the Ticosonde-TCSP campaign in July 2005 provided evidence of tropopause dehydration induced by cooling in equatorial waves on a time scale of 4-5 days.

Dr. Henry Selkirk and his colleagues Dr. Leonhard Pfister of the NASA-Ames Research Center and Dr. Jimena Lopez of the BAER Institute at NASA-Ames are leading the radiosonde program in conjunction with Profs. Walter Fernandez and Jorge Andrés Diaz of the Escuela de Fisica at the Universidad de Costa Rica (UCR), Prof. Jorge Amador of the Centro de Investigaciones Fisicas at UCR, Werner Stolz of the Instituto Meteorologico Nacional (IMN) and Dr. Pedro León of the Centro Nacional de Alta Tecnologia (CeNAT). Radiosonde launches will be conducted by IMN personnel in collaboration with UCR students at the sonde site at the west end of the airport. The Vaisala RS92-SGP sondes will be launched on 500- and 600-gram balloons and should reach an average of 28 km.

Dr. Holger Vömel of the University of Colorado and the NOAA Earth Systems Research Laboratory (ESRL) is leading the CFH-ozonesonde launch program in partnership with IMN and Dra. Jessica Valverde of the Universidad Nacional (UNA). The CFH/ozonesonde launches will also be made from Juan Santamaria International Airport approximately every other day during the aircraft flight campaign by a team composed of IMN staff and students from UNA under the direction of Dra. Valverde. The typical altitude achieved by the 1200-g CU balloons is 30 km.

A small team led by Dr. Vladimir Yushkov from the Central Aerological Observatory, Dolgoprudny, Russia will visit Costa Rica and in cooperation with Dr. Vömel will launch several balloon-borne Lyman-α hygrometers at Costa Rica. Dr. Vömel will also cooperate with the Instituto Nacional de Meteorología y Hidrologia of Ecuador and conduct a simultaneous CFH/ozone sonde launch program at San Cristobal, Galapagos.

Launches of both radiosondes and the water vapor- and ozonesondes will be coordinated with ozonesonde launches at Las Tablas, Panama, by a team led by Profs. Anne M. Thompson of the Penn State University and Gary Morris of Valparaiso University. An additional collaboration is planned with Dr. Grace Peng of The Aerospace Corporation, Los Angeles, CA who is planning to launch 28 radiosondes this summer from Juan Santamaria and at the Panama site in support of validation activities for the NPOESS and DMSP programs.

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