Title: OTREC Radiosonde Data from Limon, Costa Rica

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Time of Interest: 2019/08/16 23:00:00 to 2019/09/30 13:00:00

Area of Interest: 83.0255°W, 9.9622°N, Limon, Costa Rica

Data Frequency: Nominally 12-hourly with periods of 2-3 hourly launches

Data Types: Ascii (.txt), Aspen (.csv)

General Data Description:

Sonde system: Grawmet v 5.9.3.13
Sonde model: Graw DFM-09

Site Description: The OTREC launch site for Limon was located at the Limon airport south of the main city. The launch site was situated on the southwest corner of the runway, less than a kilometer from the Caribbean Sea to the east. This setting was selected specifically for sampling air off the Caribbean with little land influence.

Data Comments:
The sounding system at Limon had software issues that resulted in poor realtime altitude and pressure information about 20-25% of the time. The Grawmet software permits “simulating” the soundings after they have completed. Raw temperature, humidity and winds were not corrupted by these software problems. Our Grawmet system setup would corrupt only the altitude information, which then affected the pressure calculation (no pressure sensor on the sonde). This would often happen towards the end of the launch, but sometimes even in mid troposphere. Altitudes affected were primarily the surface to mid troposphere. Simulation of

Figure 1: Limon radiosonde launch site, Limon airport, Limon, Costa Rica. IMN meteorological tower can be seen in the background at center left. Photo credit: Yolande Serra

the sounding would generally fix the problem. If the simulation repeated the issue, we would stop the simulation before it occurred and just use the simulation for the lower portion of the sounding, using the good altitude data at upper levels for the upper portion of the sounding. For a few soundings, the simulation also would corrupt the altitude within a few hundred meters of the launch. As all uncorrupt soundings had very linear altitude with height, we decided to interpolate the altitude for these few soundings and then recalculate pressure. Sensor data and GPS winds were not interpolated as only altitude seemed to be affected. On rare occasions the pressure data were not affected, only altitude. A flag has been added to these data to indicate which points, if any, have come from a simulation or have interpolated altitudes and/or recalculated pressure values. The meaning of the flags are as follows: 0 = raw data, 1 = simulated data, 2 = interpolated altitude from raw data and recalculated pressure from hydrostatic equation, 3 = interpolated altitude from simulated data and recalculated pressure from hydrostatic equation, 4 = interpolated altitude from raw data, no pressure correction needed.

In addition to the software issues, we lost our GPS receiver from 31 Aug 2019 12Z to 6 Sep 2019 12Z, producing a gap in the 2xdaily data. Shipping issues resulted in a late start for our launches while we waited for sondes to arrive. The first official launch was 16 Aug 2019 at 23Z. The launch on 9 Aug 2019 at 21Z was a test launch of our system.

Higher frequency launches:
25 Aug 2019 14Z, 16Z, 18Z
12 Sep 2019 21Z to 18 Sep 18Z 3-hourly launches

Sensor Information (from https://www.graw.de/fileadmin/cms_upload/en/Resources/.pdf):

Sensor	**Type**	**Accuracy**	**Resolution**
Temperature	Thermistor	±0.2°C	±0.1°C
Relative Humidity	Capacitive polymer	4%	1%
Altitude	GPS	Position < 10 m	N/A
Winds	GPS	Velocity < 0.1 m/s	N/A

For questions please contact the OTREC PI for the surface network Yolande Serra, yserra@uw.edu.

Acknowledgements: We thank all the undergraduate students from the University of Costa Rica and the graduate students from Rutgers University, UNAM, UW and the Polish Institute of Technology for their hard work and dedication during OTREC. These data could not have been collected without their assistance. We also thank the staff at EOL who helped with shipping and logistics during OTREC.

Filename raw data: OTREC_LIMON_sounding_yyyymmdd_hhZ_final.txt
Filename Aspen csv: OTREC_LIMON_sounding_yyyymmdd_hhZ_final.Aspen.csv

Data Restrictions: None.

Digital Object Identifier (DOI): 10.26023/9KHX-9BBH-TX0E

GCMD Keywords:
EARTH SCIENCE>ATMOSPHERE> ALTITUDE>GEOPOTENTIAL HEIGHT
EARTH SCIENCE>ATMOSPHERE> ALTITUDE>BAROMETRIC ALTITUDE
EARTH SCIENCE>ATMOSPHERE> ATMOSPHERIC TEMPERATURE>UPPER AIR TEMPERATURE
EARTH SCIENCE>ATMOSPHERE> ATMOSPHERIC WATER VAPOR>WATER VAPOR PROFILES
EARTH SCIENCE>ATMOSPHERE> ATMOSPHERIC WINDS>WIND SPEED
EARTH SCIENCE>ATMOSPHERE> ATMOSPHERIC WINDS>WIND DIRECTION