Mexican UNAM R/V El Puma Radiometer Data

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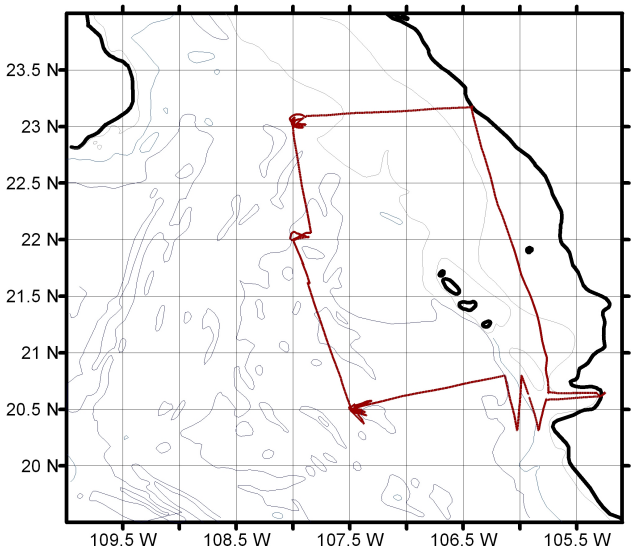
1. Introduction

This data report describes radiometer measurements and data obtained during a cruise of the *R/V Puma- UNAM* in the Eastern Pacific. These measurements were part of the North American Monsoon Experiment (NAME). The cruise occurred from 4 August 2004 to 16 August 2004 (Fig. 1a).

The *R/V PUMA* is a research vessel owned and operated by the National Autonomous University of Mexico (UNAM) in Mazatlán, Mexico (Fig. 1b). Funding to support this cruise was from the UNAM and Dr. Artemio Gallegos García was the Chief Scientist. The responsible scientist for the solar radiation measurements was Dr Agustin Muhlia.



(b)

(a)

Figure 1: a) Cruise Track; b) R/V El PUMA

2. Measurements

This report describes radiometer measurements. Data from all these measurements were obtained from the radiometer mast installed on the prow of the ship about 4 meters high from the sea level (Figure 2) at every 1 minute and stored on a PC twice a day and stored and every evening all data were written on a CD (backup). All radiometer measurements were successful for the entire cruise.

Instrumentation used

It was used a system of pyranometers classified by the World Meteorological Organization (WMO) as secondary standards, recently calibrated, to measure the irradiance of the short wavelengths (0,3 mm to 4,0 mm) radiation energy, and system of high precision pyrgeometers, recommended by the "Baseline Surface Radiation Network" supported by the WMO, to measure the long wavelength radiation (4,5 mm to 42.0mm). Both systems mounted in the end of the bowsprit on the ship prow, using an inertial platform to maintain the surfaces of the sensors next to the horizontal position. The system of radiometers is formed by the following instruments:

1. Kipp&Zonen Pyranometer, CM21 Model, Serial Number 021063 to measure the total solar short wave radiation (Kb).
2. Kipp&Zonen Pyranometer, CM11 Model, Serial Number 038094 to measure the reflected solar short wave radiation (Ks).
3. Kipp&Zonen Pyrgeometer, CG4 Model, Serial Number 030629 to measure the emitted long wave radiation (Lb) by the atmosphere.
4. Kipp&Zonen Pyrgeometer, CG4 Model, Serial Number 030670 to measure the emitted long wave radiation (Ls) by the sea surface.
5. HP Multi channel datalogger, 34970A Model, for measurements and storage of thermoelectric signals of the four instruments and thermistors incorporated to the pyrgeometers for thermical compensation
6. Toshiba Laptop Satellite model 330CDS for data storage.

(a) **(b)**

Figure 2. a) *R/V PUMA* with the radiometer equipment circled in red; b) radiometer equipment detail

3. Results

3.1 Time Series

Following is an example of radiation component measurements and the resulting energy budget (Fig. 3)

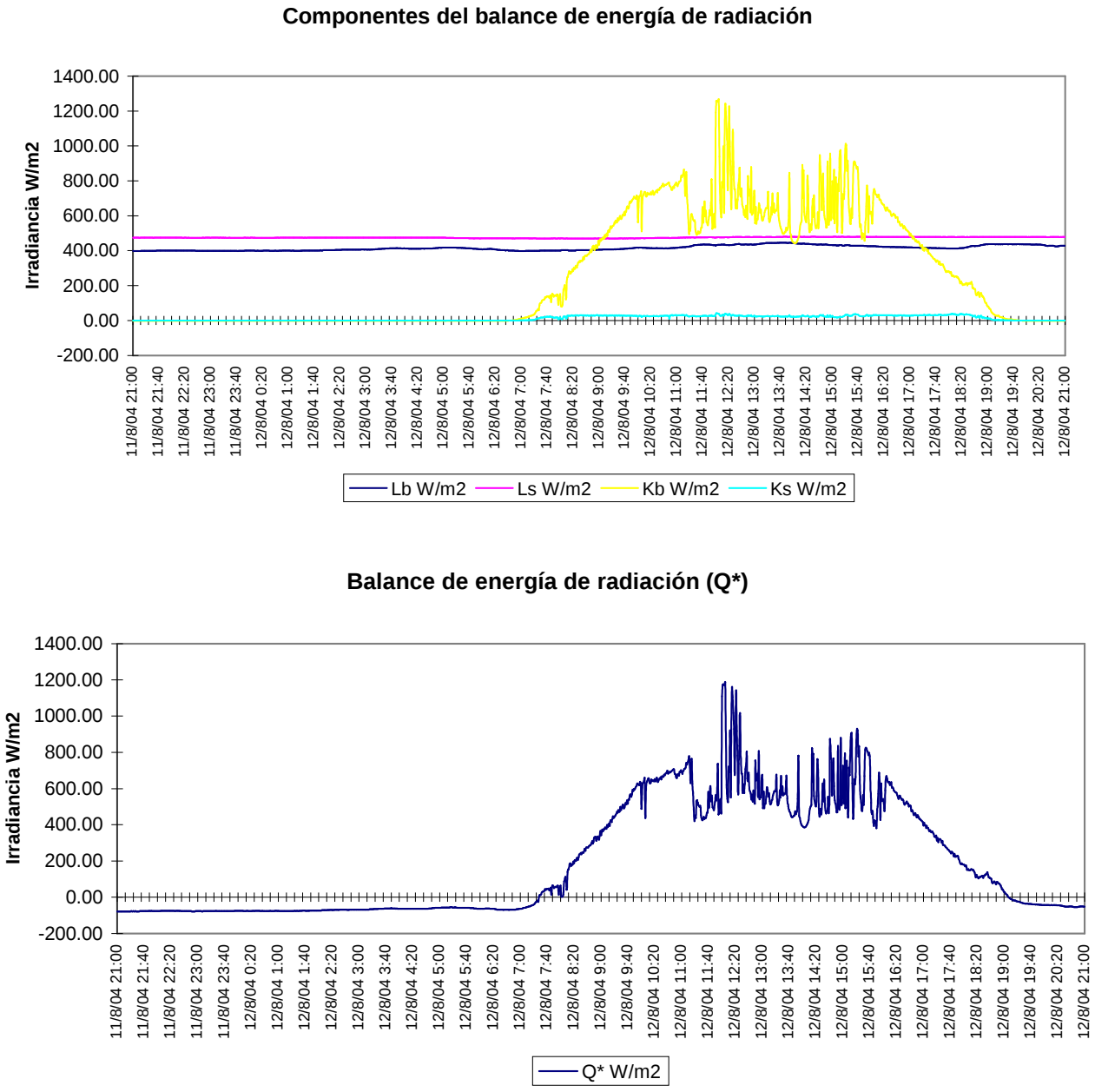


Figure 3.a) component radiation data; b) radiation balance budget

4.0 Data Sets

All data described here are available from Dr. Muhlia. The primary data sets consist of 1 minute averages for 24hours period. Here is information on the files:

Filename: ***ec*ddmmyy_1_1.xls**
dd = two digits day
mm = two digits month
yy = last two year digits
Format: Excel
Column variable names:
Column 1 –date and local time (Mazatlán time)
Column 2 – Total solar radiation , Rg (Kb), in irradiance (W/m^2)
Column 3 – Reflected solar radiation, Rr (Ks), in irradiance (W/m^2)
Column 4 – longwave emitted atmospheric radiation, Ra (Lb), in irradiance (W/m^2)
Column 5 – longwave radiation emitted by the sea surface, Rs (Ls), in irradiance (W/m^2)
Column 6 – Q*(radiation energy budget) = (Kb - Ks) + (Lb – Ls)

In Excel, use the "open" command to open the data set (Fig. 4). The above variable names will be assigned automatically.

Fecha y Hora local	Kb(Rg) W/m2	Ks(Rr) W/m2	Lb(Ratm) W/m2	Ls(Rmar) W/m2	Q*(balance) W/m2
2/9/04 11:15	766.00	43.58	506.45	477.41	751.45
2/9/04 11:16	745.31	51.34	503.99	476.72	721.24
2/9/04 11:17	689.59	32.28	506.80	480.33	683.78
2/9/04 11:18	657.15	69.50	505.58	482.26	610.97
2/9/04 11:19	617.54	62.30	500.00	478.91	576.34
2/9/04 11:20	619.94	59.95	502.14	480.26	581.86
2/9/04 11:21	360.30	36.41	493.87	479.72	338.04
2/9/04 11:22	701.26	41.78	503.70	480.63	682.55
2/9/04 11:23	595.73	11.05	506.50	486.15	605.04
2/9/04 11:24	686.40	37.91	504.64	482.93	670.20
2/9/04 11:25	682.18	48.06	509.36	481.97	661.52
2/9/04 11:26	413.97	40.45	506.56	481.30	398.77
2/9/04 11:27	358.44	32.20	508.17	482.89	351.52

Figure 4. Example of excel data format

Acknowledgements

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