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Overseas Development Report



The Anglo-Brazilian Amazonian Climate Study [ABRACOS]

Interim Report on Phase 2, 1 April to 30 March 1995:

Report No 11

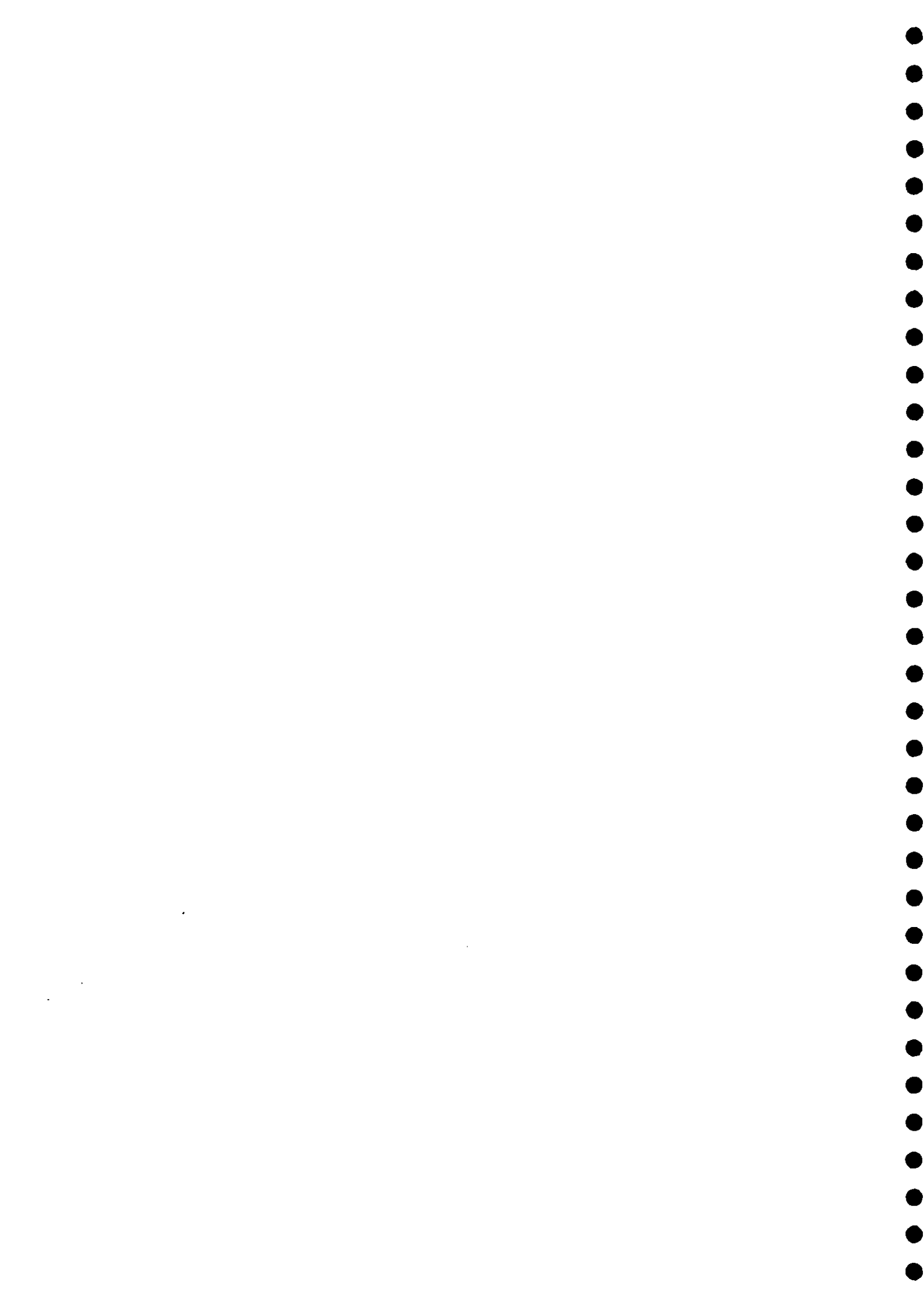
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1. SUMMARY

- i) The ABRACOS network has been operating as planned.
- ii) New stations are in operation in the forest near Manaus and in the cerrado near Brasilia.
- iii) The editing of the ABRACOS book continues with good progress.
- iv) The ABRACOS database has been completed

2. INTRODUCTION

Phase 2 of ABRACOS was designed to allow sufficient funds to keep the network of climate and soil stations initiated by the ABRACOS project operational for a further year after the end of the main project and in the run up to the Large-scale Biosphere-Atmosphere Experiment in Amazonia (LBA).

In addition costs associated with the production of the book of papers presented at the ABRACOS Symposium in Brasilia in September 1994 were transferred to this phase of the project, as delays in the preparation of the book meant that it could not be produced within Phase 1.

3. ACHIEVEMENTS

The network of stations has been operated over the reporting period. Data are being collected and processing, analysis and archiving of the data are operating smoothly under the control of CPTEC/INPE.

The automatic weather station previously operated as the Manaus city station has been transferred to a new forest site and is now operational on the steel tower in the INPA research forest in the area known as ZF2. Soil moisture access tubes have also been installed at this site. A study of carbon dioxide flux measurement will take place at this site starting in November 1995. The study is a collaboration principally between INPA, the Institute of Hydrology and the University of Edinburgh. It is intended that this site will continue operation as a contribution to LBA.

An automatic weather and soil moisture station has been installed in the cerrado (bush savannah) close to Brasilia. This station, which is being operated by the University of Brasilia, is comprised of equipment donated under Phase 1. It will also continue operation as a contribution to LBA.

The editing of the ABRACOS book is proceeding, with some 80 per cent of the papers now having been passed to the copy editors.

The ABRACOS database has been completed and is circulating among the project participants. The database will be made available to non-project participants on 1 January 1996, in accordance with the original project plan. The Introduction to the database is included as an appendix to this report.

4. FINANCE

The financial overview has not changed since the previous report (No 10) and therefore no report on the finances is included in this report.

APPENDIX

A Text file for the ABRACOS database

The following pages are the introductory text files which will be supplied with the ABRACOS database when it is released to non-project participants. Following this introduction, the data base contains a series of text files which give the essential details of the sites and equipment and how it was deployed.

ABRACOS Data base - Introduction

OBJECTIVE

The objective of the Anglo-Brazilian Climate Observation Study (ABRACOS) was to provide data for the calibration and validation of GCMs and GCM sub-models of Amazonian forest and post-deforestation pasture (Shuttleworth *et al.*, 1991, Gash *et al.*, 1995). This data base presents the principle data output from the project, containing quality controlled information from the four main study topics considered by the project: climate micrometeorology, plant physiology and soil physics.

SITES

Three areas were instrumented, each with different soils, dry season intensities and deforestation densities. In each area an automatic weather station and soil moisture measurement equipment were installed at a primary forest site and in nearby cattle pasture, for the monitoring of climate and soil status throughout the year. Additional intensive periods of study, of varying durations, were operated at these sites for calibration purposes, to understand the physical processes relevant to each site for detailed comparisons between sites. Further site and data mission details are given in ABR_AWS.TXT and ABR_MMET.TXT respectively.

STRUCTURE

The data are divided into four groups of files representing climate, micro-meteorology, plant physiology and soils. Each group having several data files together with a single text file (.TXT) giving full details of data format, duration, instrumentation, quality details and problems.

1. AUTOMATIC WEATHER STATION (AWS)

Hourly average climate data including temperature, humidity, rainfall and radiation balance. The weather stations were installed between September 1990 and August 1991 and, with the exception of the Manaus urban AWS, the data herein terminates at December 1993. However, the stations were not closed down on this date but continue to be operated by INPE (Sao Jose Campos). Data from seven AWSs are given: representing pasture and forest and each of the three Amazonian regions (central, Manaus; south-western, Ji-Parana; and eastern, Maraba) plus data from an AWS located to represent the urban climate of Manaus city.

There are 222 files each containing one month of data and having a name format as follows

[site]-H[month].[year]Pe.g. FD-HO2.92P

To access these files it is necessary to 'unpack' the relevant compressed file (e.g. FD.ZIP). There are seven compressed files, one for each of the weather stations. Full details are given in ABR_AWS.TXT.

2. MICROMETEOROLOGY

Hourly estimates of evaporation, heat flux and conductances supported by calibrated estimates of the hourly momentum flux and atmospheric stability. The data were recorded during intensive study periods at the three pairs of sites where the AWSs were installed, and range in duration from 3 weeks to 3 months. There are 10 files, one for each mission: and compressed into a single file (ABR_MMET>ZIP), having names in the following format

[veg][mission].DAT

e.g. PASTM45.DAT

where 'veg' is 'PAST' or 'FORST' for pasture or forest and where mission gives the campaign code eg 'M3'.

Full details are given in ABR_MMET.TXT.

3. PLANT PHYSIOLOGY

Plant physiological data are grouped into the three information types outlined below. Full details of instruments and experimental techniques and arrangements are given in ABR_VEG.TXT.

a. Plant structure

ALLLAI.DAT is a single file which tabulates the physical properties of 2 sites, including, height, leaf and stem area index, and biomass.

b. Porometry

M3NSLEAF.DAT and M3RJLEAF.DAT contain porometry and leaf water potential measurements for the pasture (NS) and forest (RJ) respectively. All measurements were made during the 1992 intensive data mission (M3) at Ji-Parana, Rondonia. The tabulation includes leaf temperature, PAR, stomatal conductance, net photosynthesis, carbon dioxide flux and leaf water potential.

c. **In-canopy forest profiles**

A total of 29 files, compressed into files ABR_PAR.ZIP and ABR_TDU.ZIP giving 10 minute profiles of PAR, temperatures, humidity and wind speed at the Manaus and Ji-Parana forest sites. The profiles have six levels from about 5 m from the ground to the top of the canopy. The file name format is as follows.

`[code][n][type][#].DAT`

where

code is RD for Manaus or RJ for Ji-Parana

n id the data type

type id the data type

PAR (Photosynthetically Active Radiation)

or TDU (Temperature, humidity deficit and wind speed)

is the sequence letter

4. **SOIL MOISTURE**

Mean soil moisture content is presented for three pairs of forest and pasture sites. The data were recorded about once every 7 days and at 20-30 cm depth increments from the surface down to 3.6 m. More frequent measurements were made during the intensive data missions.

The six files names have the format SOIL[site code].DAT compressed into ABR_ZIP, with supporting test file ABR_VEG.TXT.

5. **ACKNOWLEDGEMENT**

Publications using these data should acknowledge the sources as follows:

These data were collected under the ABRACOS project and made available by the Institute of Hydrology (UK) and the Instituto Nacional de Pesquisas Espaciais (Brazil). ABRACOS is a collaboration between the Agência Brasileira de Cooperação and the UK Overseas Development Administration.

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6. REFERENCES

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Shuttleworth, W. J., Gash, J.H.C., Roberts, J.M., Nobre, C.A., Molion, L.C.B and Ribeiro, M.N.G. 1991. Post-deforestation Amazonian climate: Anglo-Brazilian research to improve prediction. *J. Hydrol.*, 129: 71-85.