



Energy and Water Cycles in the Climate System

Edited by
Ehrhard Raschke Daniela Jacob

NATO ASI Series

Series I: Global Environmental Change, Vol.5

295/364A

Energy and Water Cycles in the Climate System

Edited by

Ehrhard Raschke

Daniela Jacob

GKSS

Forschungszentrum Geesthacht GmbH

Max-Planck-Straße

2054 Geesthacht, Germany



Springer-Verlag

Berlin Heidelberg New York London Paris Tokyo

Hong Kong Barcelona Budapest

Published in cooperation with NATO Scientific Affairs Division

INSTITUT
FÜR METEOROLOGIE U. KLIMATOLOGIE
UNIVERSITÄT HANNOVER
HERRENHÄUSER STR. 2 - 30419 HANNOVER

Contents

FOREWORD	VII
1 ATMOSPHERIC ENERGETICS AND THE WATER CYCLE J.P. Peixoto	1
2 ASPECTS OF LARGE SCALE MODELLING E. Klinker	43
3 RADIATION-CLOUD-CLIMATE INTERACTION E. Raschke	69
4 CONVECTIVE AND LARGE-SCALE CLOUD PROCESSES IN GCMS A. Del Genio	95
5 SATELLITE OBSERVATIONS OF RADIATION AND CLOUDS TO DIAGNOSE ENERGY EXCHANGES IN THE CLIMATE: PART I W.B. Rossow	123
5 SATELLITE OBSERVATIONS OF RADIATION AND CLOUDS TO DIAGNOSE ENERGY EXCHANGES IN THE CLIMATE: PART II W.B. Rossow	143
7 OBSERVATION AND ANALYSIS OF GLOBAL RAINFALL E. Ruprecht	165
8 DATA ASSIMILATION PROBLEMS O. Talagrand	187
9 FORCING THE OCEAN BY HEAT AND FRESHWATER FLUXES J. Willebrand	215

10 MODELLING OF OCEANS CIRCULATION	
P. Delecluse	235
11 OBSERVATIONS OF AIR SEA FLUXES	
L. Hasse	263
12 SEA-ICE INTERACTIONS IN POLAR REGIONS	
J.P. van Ypersele	295
13 THE SOIL-VEGETATION-ATMOSPHERE INTERFACE	
W.J. Shuttleworth	323
14 OBSERVING AND MODELLING THE PLANETARY BOUNDARY LAYER	
S. Larsen	365
15 THE TERRESTRIAL HYDROLOGICAL CYCLE	
J.N.M. Stricker, C.P. Kim, R.A. Feddes, J.C. van Dam, P. Droogers and G.H. de Rooij	419
A DATABASES FOR GEWEX RESEARCH	
J. Dozier	445
B POSTER-SESSION	
M. Quante, J. Francis and A. Temel	453
INDEX	460