GLOBAL ENERGY AND WATER CYCLE EXPERIMENT (GEWEX) AND THE CONTINENTAL-SCALE INT'L PROJECT (GCIP)

DEBORAH VANE

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

94-15918
The Complex Role of Water in Climate Processes
GEWEX OBJECTIVES

ESTIMATE OF THE GLOBAL WATER CYCLE FLUXES AND RESERVOIRS

- TERRESTRIAL ATMOSPHERE
  - ADVECTION 40
- MARINE ATMOSPHERE
  - EVAPORATION 425
  - RAIN 385
- ICE, SNOW, LAKES, AQUIFERS
  - RIVERS 40
  - EVAPORATION AND TRANSPARATION 71
- OCEANS
  - RAIN 111
  - EVAPORATION 1,400,000

UNITS IN THOUSANDS OF CUBIC KILOMETERS

- DETERMINE THE HYDROLOGICAL CYCLE BY GLOBAL MEASUREMENTS
- MODEL THE GLOBAL HYDROLOGICAL CYCLE
- IMPROVE OBSERVATIONS AND DATA ASSIMILATION
- PREDICT RESPONSE TO ENVIRONMENTAL CHANGE
GEWEX

HYDROMETEOROLOGY

CLOUD AND PRECIPITATION SYSTEMS

GLOBAL PRECIPITATION CLIMATOLOGY PROJECT (GPPC)

INT'L SATELLITE LAND SURFACE CLIMATOLOGY PROJECT (ISLSCP)

GEWEX CONTINENTAL-SCALE INT'L PROJECT (GCIP)

GLOBAL RUNOFF DATA CENTRE (GRDC)

INT'L SATELLITE CLOUD CLIMATOLOGY PROJECT (ISCCP)

GEWEX CLOUD SYSTEM STUDY (GCSS)

GEWEX WATER VAPOR PROJECT (GVAP)

SURFACE RADIATION BUDGET PROJECT (SRB)

BASELINE SURFACE RADIATION NETWORK (BSRN)

RADIATION
GCIP OBJECTIVES

- DETERMINE TIME/SPACE VARIABILITY OF HYDROLOGICAL CYCLE OVER A CONTINENTAL-SCALE REGION
- DEVELOP MACRO-SCALE HYDROLOGIC MODELS, COUPLED TO ATMOSPHERIC MODELS
- DEVELOP INFORMATION RETRIEVAL SCHEMES
- SUPPORT REGIONAL CLIMATE CHANGE IMPACT ASSESSMENT
GCIP STRATEGY:
DEVELOPING COUPLED
LAND-SURFACE/ATMOSPHERE MODELS

AGGREGATION

RAIN

TOPOGRAPHY

VEGETATION

SOIL

CLIMATE MODEL
GRID SCALE

"DISAGGREGATION"

HYDROLOGICAL/
METEOROLOGICAL
MODEL

TRANSFERS

LAND

SEA
GCIP, GCSS, AMIP AND SCALE-INTERACTIVE MOIST PROCESSES

ATMOSPHERIC MODEL INTERCOMPARISON PROJECT (AMIP)
- CLIMATE/GCM INTERCOMPARISONS
- REGIONAL DISTRIBUTION AND NATURE OF CLIMATOLOGY ERRORS
- FOCUS ON "FAST" COMPONENT OF CLIMATE

GEWEX CONTINENTAL-SCALE INTERNATIONAL PROJECT (GCIP)
- COORDINATE WITH AMIP: REGIONAL SKILL OF GCMs vs MESO MODELS
- COORDINATE WITH GCSS: TEST GCSS-DEVELOPED MOIST PARAMETERS ON REGIONAL SCALE

GEWEX CLOUD SYSTEM STUDY (GCSS)
- MULTI-SCALE INVESTIGATIONS OF CLOUD PROCESSES JOINS OBSERVATIONS AND MODELS
- DEVELOP NEW CLOUD, CONVECTION PARAMETERS
- USE TRAILFINDER/ARM SITES AS MAJOR DATA SOURCE
GCIP FIELD CAMPAIGNS

- FEW, FOCUSED
  -- TEST MODELS
  -- VALIDATE REMOTE SENSING DATA

- COOPERATIVE MULTISCALE EXPERIMENT
  SPRING/SUMMER '95 (CMESS)
  -- STUDY MESOSCALE CONVECTIVE SYSTEMS
  IN CENTRAL U.S.
  -- USWRP, DOE/ARM, FAA, GVAP, GCSS, GCIP

- 1996/97 (?)
  -- VALIDATE FLUX MODELS FORCED BY
  REMOTE SENSING AND IN-SITU DATA