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
The Complex Role of Water in Climate Processes

- Atmospheric vapor
- Clouds & aerosols
- Evaporation
- Precipitation
ENVIRONMENTAL CHANGE
PREDICT RESPONSE TO
AND DATA ASSIMILATION
IMPROVE OBSERVATIONS
MODEL THE GLOBAL
HYDROLOGICAL CYCLE
GLOBAL MEASUREMENTS
HYDROLOGICAL CYCLE BY
DETERMINE THE

GEWEX OBJECTIVES

FLUXES AND RESERVOIRS
ESTIMATE OF THE GLOBAL WATER CYCLE

UNITS IN THOUSANDS OF CUBIC KILOMETERS
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
GCIP, GCSS, AMIP AND
SCALE-INTERACTIVE MOIST PROCESSES

ATMOSPHERIC MODEL
INTERCOMPARISON PROJECT (AMIP)

- CLIMATE/GCM INTERCOMPARIIONS
- 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 DATABASE

GEOPHYSICAL DATA
HYDROLOGIC BOUNDARIES •
STREAMS, TOPOGRAPHY •
VEGETATION, LAND USE •
SNOW COVER •
ALBEDO •
SOILS •

REMOLELY SENSED DATA
RADAR PRECIPITATION (NEXRAD) •
LONG AND SHORT-WAVE FLUX AT T.O.A. •
SATELLITE AND AIRCRAFT VIS, IR AND M WAVE •
AVHRR NDVI •
CLOUD CHARACTERISTICS •
WATER VAPOR •

DERIVED DATA FIELDS
NMC GRID POINT INITIALIZATIONS •
PRECIPITATION •
SOIL MOISTURE •
EVAPOTRANSPIRATION •
SURFACE FLUXES •

IN-SITU DATA
SURFACE METEOROLOGICAL OBSERVATIONS •
RADIOSONDAS •
RAIN GAUGES •
WIND PROFILERS •
RIVER RUNOFF •
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