

World Climate Research Programme

Data Advisory Council, 2nd session

Darmstadt, Germany, 4-5 March 2013

M. Rixen, JPS, Geneva

Mission & Objectives

-  **World Climate Research Programme** supports **climate-related decision making** and **adaptation planning** by coordinating research required to improve
- (1) climate predictions and
 - (2) understanding of human influence on climate

“for use in an increasing range of practical applications of direct relevance, benefit and value to society”

(WCRP Strategic Framework 2005-2015).

The Interdisciplinary Nature of Climate Science

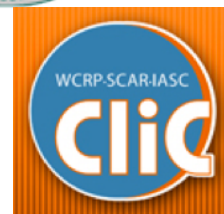
- Atmosphere, Oceans and Climate
- Cryosphere and Climate
- Atmospheric Chemistry and Dynamics
- Water, Energy and Climate



Meeting the Information Needs of Society

Activities in Support of Key Deliverables

- Decadal Variability, Predictability and Prediction
- Sea-Level Variability and Change
- Climate Extremes
- Atmospheric Chemistry and Dynamics
- Centennial Climate Change Projections
- Seasonal Climate Prediction
- Regional Climate



Activities in Support of WCRP Integrating Themes

- Climate-Quality Data Sets and Analyses
- A New Generation of Climate/Earth System Models
- Next Generation of Climate Experts: Developing Capacity Regionally and Globally

WCRP
IMPLEMENTATION
PLAN 2010-2015

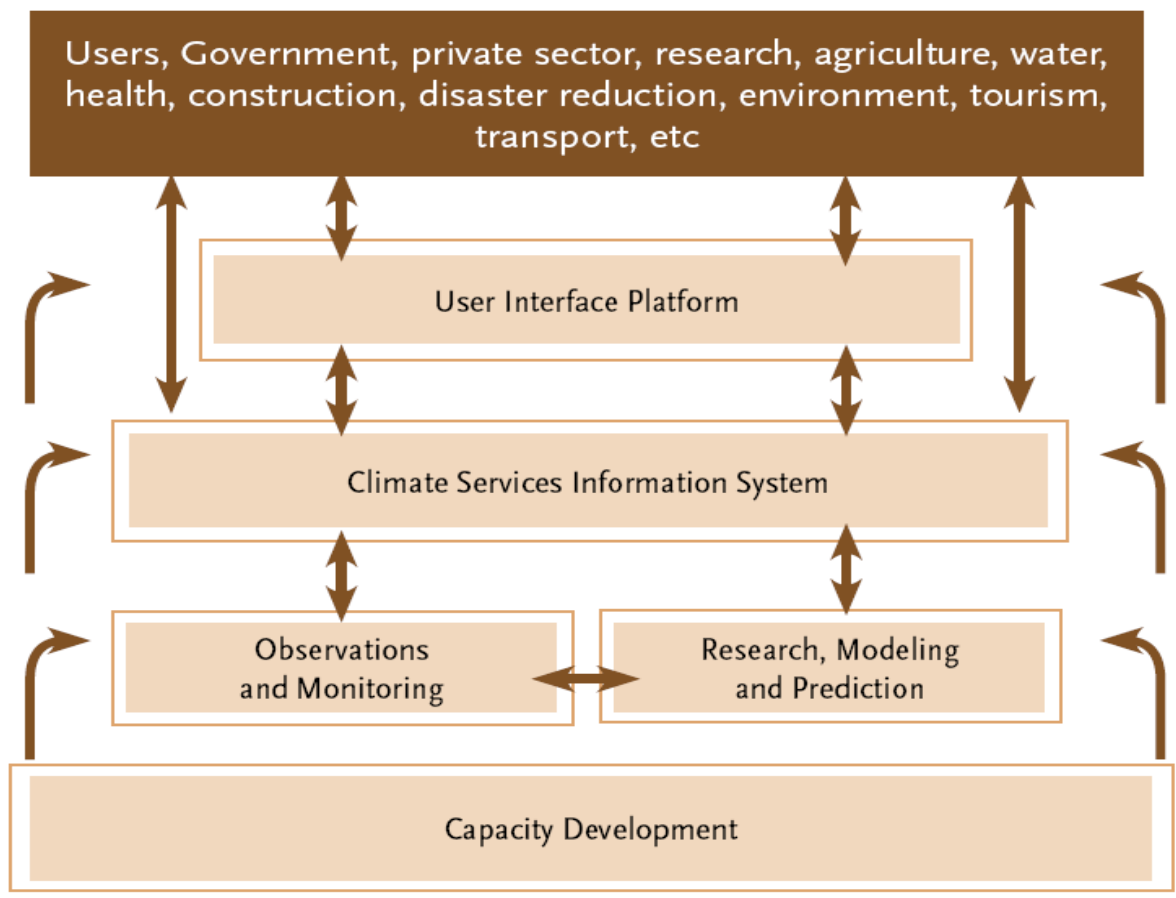
WCRP
World Climate Research Programme

Future Directions: Actionable Science

Defined as: “data, analysis, and forecasts that are sufficiently predictive, accepted and understandable to support decision-making, including capital investment decision-making.”

- World Climate Conference-3, OceanObs '09, ICSU Review and Visioning, Open Science Conference, acknowledging WCRP past contributions and identifying future challenges and opportunities
- Need for more flexibility/agility to respond to expanding users needs, that includes information:
 - At regional scale
 - For key sectors of global economy
 - For adaptation, mitigation and risk management

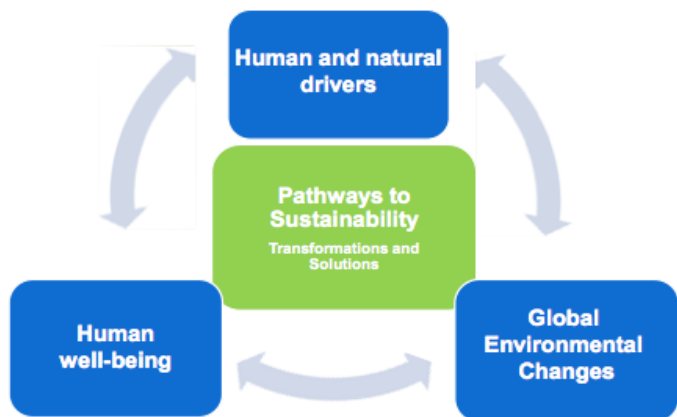
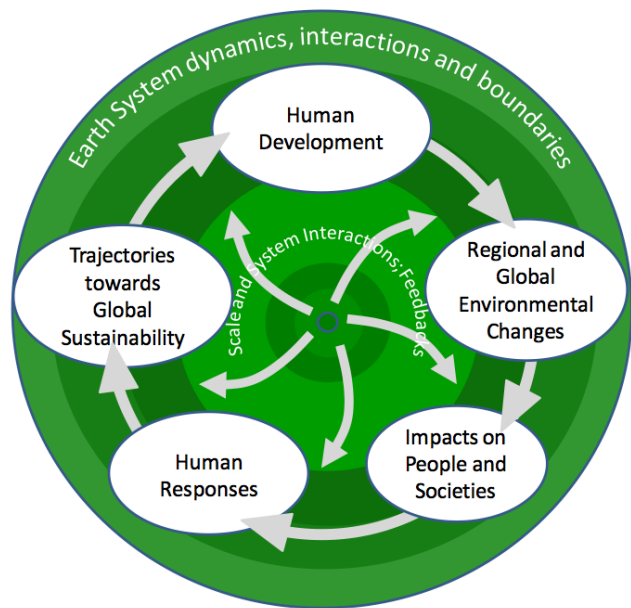
Global Framework for Climate Services (GFCS)



Proposed Research Strategy:

At the simplest level, Future Earth must answer fundamental questions about *how and why the global environment is changing, what are likely future changes, what the implications are for humans and other species, and what choices can be made to reduce harmful risks and vulnerabilities, enhance resilience, and create prosperous futures.*

	<i>Proposed Cross Cutting Capabilities</i>
C1	Observing Systems
C2	Data Systems
C3	Earth System Modeling
C4	Theory Development
C5	Synthesis and Assessments
C6	Capacity Development and Education
C7	Communication and the Science-Policy Interface



WCRP Organization

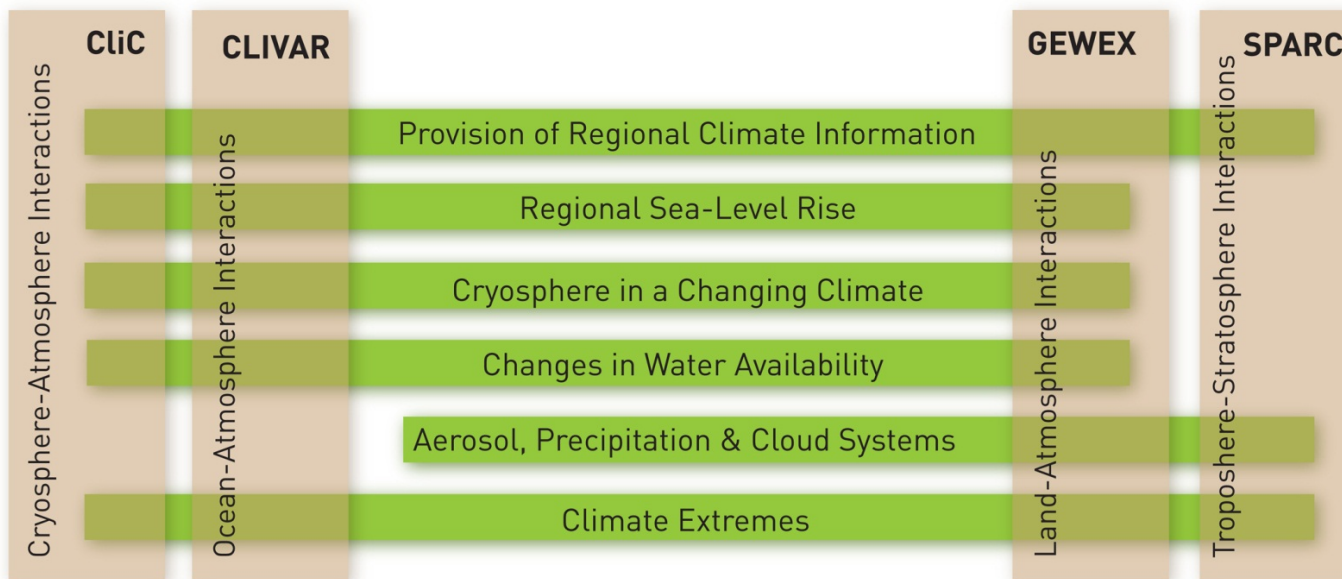
Joint Scientific Committee

Joint Planning Staff

Modeling Advisory Council

Data Advisory Council

Working Groups on: Coupled Modelling (WGCM), Regional Climate (WGRC), Seasonal to Interannual Prediction (WGSIP), Numerical Experimentation (WGNE)



7-11 May 2012

**Silver Spring,
Maryland USA**

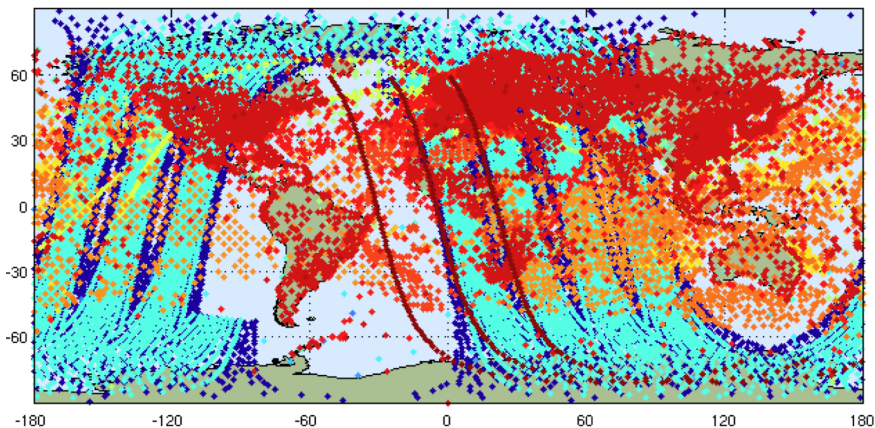
270+ participants

42 countries



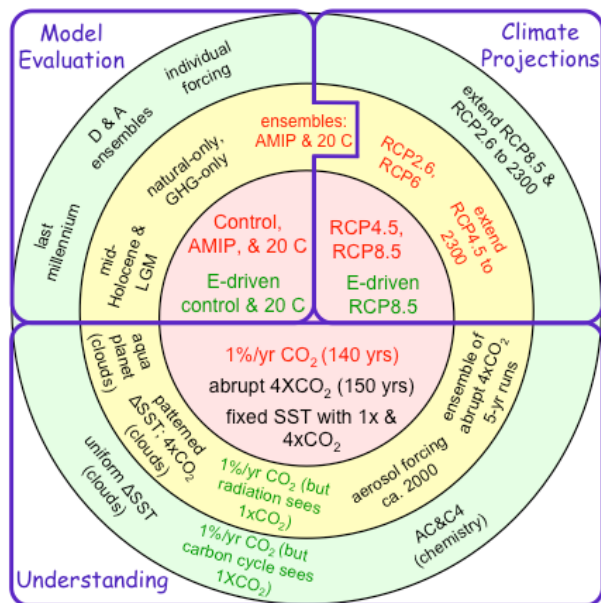
Agency Priorities: An Open Panel Discussion with Conference Participants

Observation Locations



- **Quantitative Uncertainty Estimation:**
families of reanalyses
- **Qualitative Uncertainty Estimation:**
reanalysis.org,
climatedataguide.ucar.edu
- **Earth System Coupling:**
interdisciplinarity, synergies between communities
- **Reanalyses, Observations and Stewardship:** *seamlessness of data discovery and access, ESG*

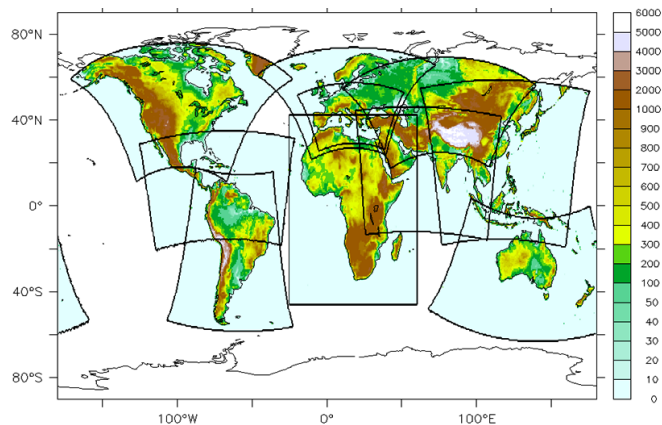
A rich set of modeling experiments, drawn from several predecessor MIPs, focuses on model evaluation, projections, and understanding



Red matches CMIP3 experimental suite
Green coupled carbon-cycle climate models

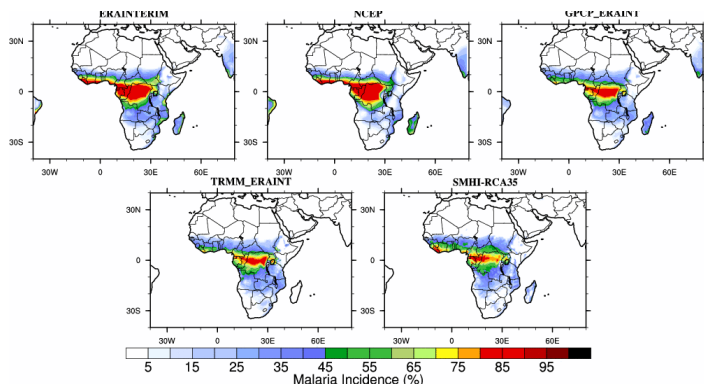
- 1+ Petabyte on ESG
- Between 15 and 22 AOGCMs, 4 to 8 decadal prediction simulation sets, about 6 high-top models, and 3 to 8 ESMs
- Considerable interest and excitement in analyzing model data to learn new things about the climate system
- Spread of projections in CMIP5 AOGCMs comparable to CMIP3, most first generation ESMs are well-behaved and produce comparable first order results to AOGCMs, but with all their additional capabilities
- Many studies contributing to the IPCC AR5 report
- Several papers in Nature and Nature Climate Change





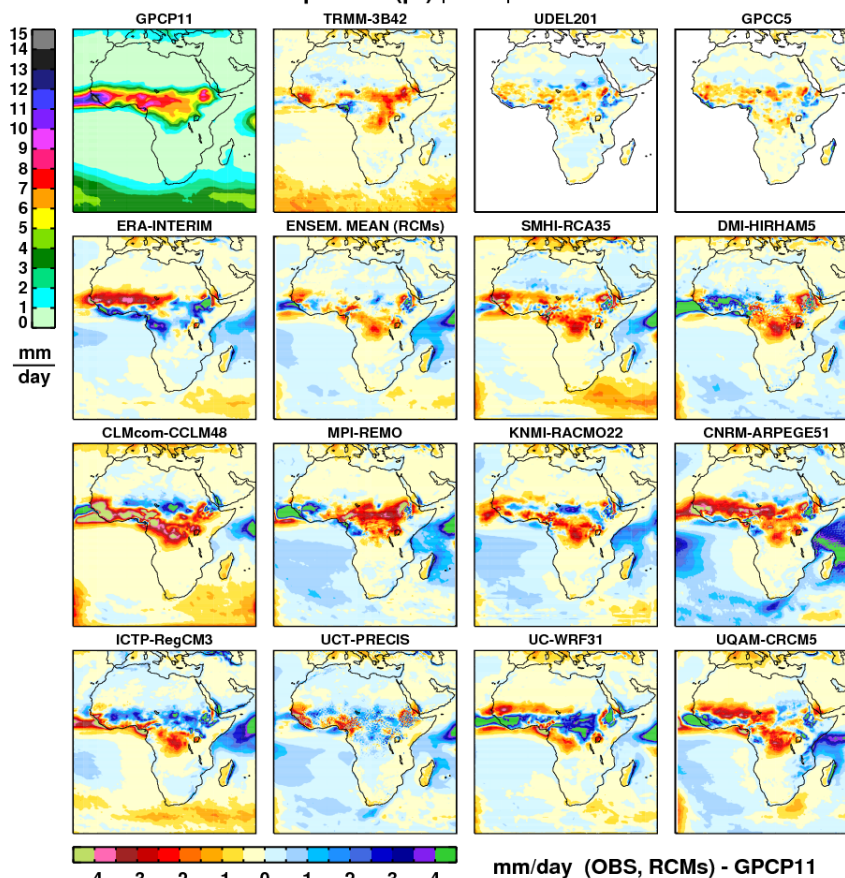
- 12 domains with a resolution of 0.44° (approx. $50 \times 50 \text{ km}^2$), focus on Africa
- High res $\sim 0.11^\circ \times 0.11^\circ$ for Europe (by some institutions)

Dynamic Malaria Model driven by climate observations & CORDEX simulations (mean annual prevalence (%))



SMHI (50 km^2) reproduces well the mean annual malaria incidence pattern with respect to TRMM-ERAINT & GPCP-ERAINT control experiment

Precipitation (pr) | JAS | 1998-2008



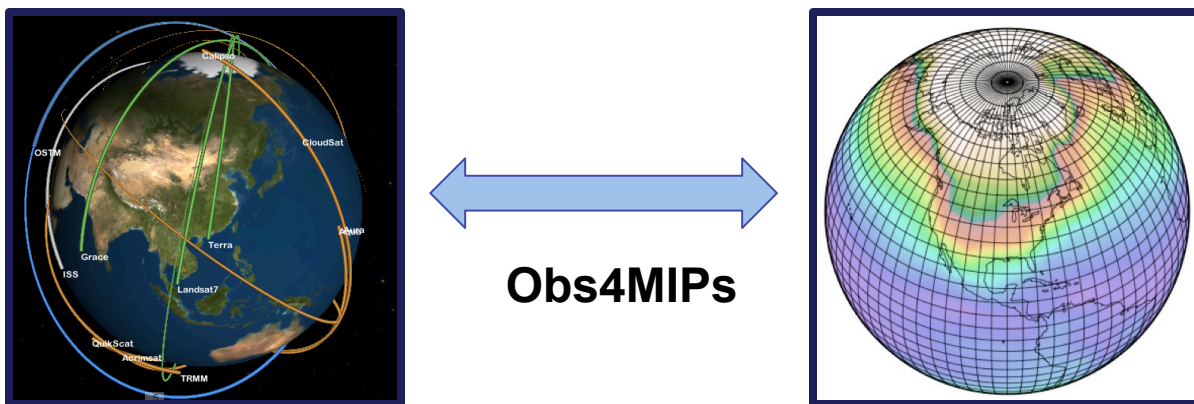
Example of CORDEX multi-model data available for Africa. From Top to bottom and left to right: GPCP mean July-August-September precipitation for 1998-2008 and differences compared to GPCP in the other gridded observations, and the individual RCMs with their ensemble average.

- 4-7 November 2013, Brussels, Belgium
- Partnership between WCRP, IPCC and EC
- Timed between IPCC WGI and WGII releases
- 1st day: High Level Session, Stakeholder dialogue
- 2-4th days: Scientific Conference
- <http://cordex2013.wcrp-climate.org/>



Intercomparison Models-Observations

Coordinated with CMIP5 are parallel efforts to collect and make available observationally-based products



A pilot effort to improve the connection between data experts and scientists involved in climate model evaluation. Aligned with CMIP5, with encouragement from the WGCM, WGNE, WDAC.

NASA and the U.S. DOE have initiated the project with significant contributions of appropriate NASA products.

Communities to contribute data to Obs4MIPs such as cryosphere, biogeochemistry, etc.

- 3 meetings:
 - Architecture for Climate Monitoring from Space
 - CEOS WG Climate
 - SCOPE-CM
- Topics:
 - ECV Inventories
 - Metrics
 - Assessments
 - obs4MIPs

Priorities for WDAC2

- ECV Inventories: facilitate discovery of climate quality data records
- Reanalysis/fluxes: coupled modeling, CORDEX forcing, model assessment
- Data requirements and uncertainties
- Assessments: summarize best practices
- ESG/obs4MIPs: growing demand and potential, how can each WDAC entity contribute?

Some meetings

- TOPC, Geneva, 6-7 March
- AOPC, Geneva, 2-5 April
- WGNE Systematic error workshop, Exeter, 15-19 April
- CLIVAR SSG, Kiel, 6-9 May
- Seasonal to Decadal, Exeter, 13-16 May
- WMAC, Brasilia, 27 May
- JSC34, Brasilia, 27-31 May
- GEWEX SSG, Boulder, 28-31 October
- CORDEX Conference, Brussels, 4-7 Nov

Secretariat

- Inputs to WDAC2 report
- We would like to publish your PPT on-line

Thank you for your attention!

CORDEX / ESG

- Euro-CORDEX teams: experience with the ESG (DKRZ, BADC, IPSL)
- DMI and SMHI/NSC developing data archiving policy
- 500 Tb for CORDEX committed
- EU project (is-ENES2) covers support for Univ. Cape Town ESG-CORDEX
- CORDEX South-Asia and East-Asia in the loop
- Med-CORDEX and East Asia archiving fairly well covered

- Models and observations: Earth System Grid, <http://www.earthsystemgrid.org/>



ESGF Gateway : Side by Side Archive with CMIP



The screenshot shows the Earth System Grid website interface. It features a search bar at the top, navigation tabs (Home, Data, Account, About, Contact Us), and a sidebar with search categories like Project, CMIP5, and Institution. The main content area lists various data sources such as AIRS, AMSR-E, AVHRR, and MODIS, each with a brief description and a link to its respective data catalog. A red box highlights the 'obs4MIPs Project' link in the sidebar.

Regional Climate Model Evaluation System

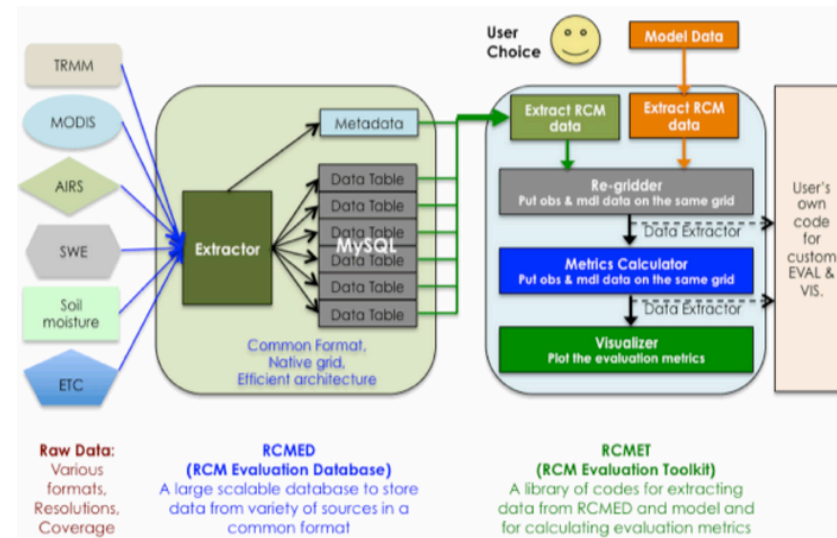


Figure 2. A schematic illustration of the outline and data flows within RCMES.