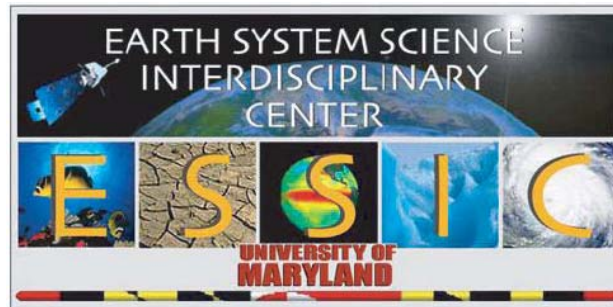


World Climate Research Programme

Moving towards Future Horizons

Antonio J. Busalacchi
Chairman, Joint Scientific Committee, WCRP



Mission & Objectives

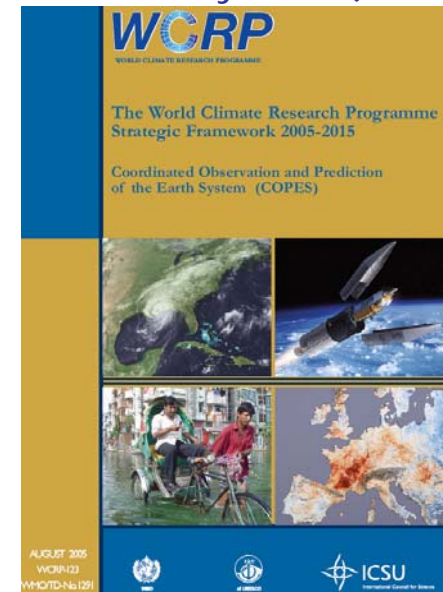
WCRP supports climate-related decision making and planning adaptation to climate change by developing the science required to determine the:

- Predictability of climate; and
- Effect of human activity on climate

Aim: "to make new advances in the analysis and prediction of the variability and change of the comprehensive Earth system for use in an increasing range of practical applications of direct relevance, benefit and value to society"

WCRP Strategic Framework 2005-2015

Coordinated Observation & Prediction of the Earth System (COPES)



Implementation

Projects, Activities & Partners

Sponsors and Partners: **WMO** | **ICSU** | **IOC-UNESCO**

Core Projects: **GEWEX** | **CLIVAR** | **SPARC** | **CLIC**

Unifying COPEs Themes: **Observations** | **Analysis** | **Modeling**

Cross-Cutting Activities: **Anthropogenic Climate Change** | **Atm. Chemistry & Climate**
Sea Level Rise | **Extremes** | **Seasonal Prediction**
Decadal Prediction | **Monsoons** | **International Polar Year**

Co-Sponsored Activities: **SOLAS** | **START** | **AOPC** | **OOPC** | **GOOS** | **GCOS**

ESSP Partners: **IGBP** | **IHDP** | **DIVERSITAS**

ESSP Joint Projects: **GWSP** | **GCP** | **GECAPS** | **GEC&HH**

Other Collaborations: **CEOS** | **CLIPS** | **DRR** | **GEO** | **GEOSS** | **GTOS** | **IGOS**
IPCC | **WWRP-THORPEX** | **UNFCCC** | **World Bank**

Climate Science Coordination & Integration Partnerships with other International Programs



SUMMARY REPORT
A STRATEGY FOR CLIMATE CHANGE
STABILIZATION EXPERIMENTS WITH
AOGCMs AND ESMs
Aspen Global Change Institute 2006 Session
Earth System Models: The Next Generation
(Aspen, Colorado, July 30-August 3, 2006)

May 2007
WCRP Informal Report N° 3/2007
ICPD Publication N° 112
IGBP Report N° 57

e.g., IGBP

AIMES, IGAC, PAGES, IMBER, iLEAPS, SOLAS

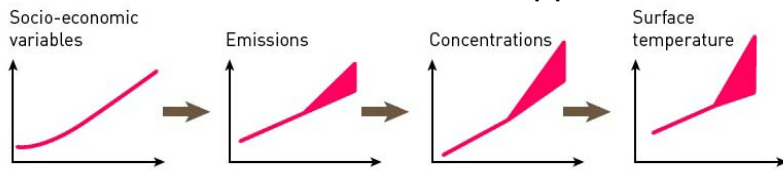


WGCM CMIP5

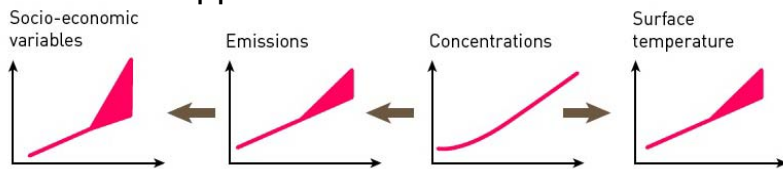
Decadal + Long-Term Protocols

Scenario Development

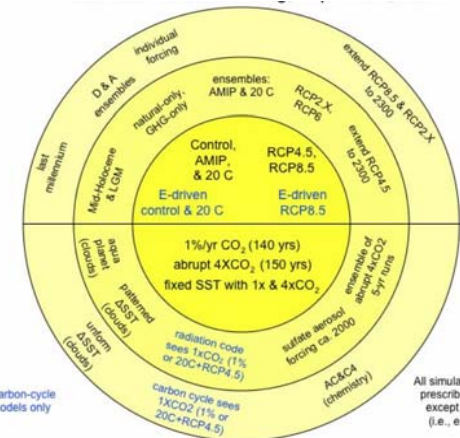
Traditional forward approach



New approach: Start with Concentrations



IPCC AR5



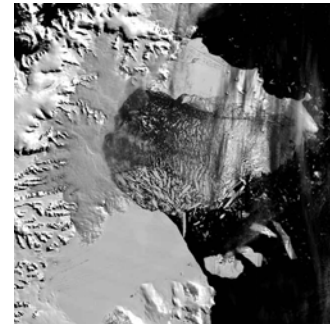
Climate Science Coordination & Integration Partnerships with other International Programs

WCRP, IGBP & GCOS Workshop: Future Climate Change Research and Observations – Lessons Learned from IPCC AR4 (Oct 2007, Sydney Australia)



Workshop examined gaps in observations and basic science raised by the IPCC (I & II), and at deficiencies in the way information about climate change can be used for estimation of impacts, design of adaptation measures, and assessment of regional vulnerability

Using vulnerability of regions and sectors to climate change is a possible framework to link urgent science questions with societal concerns. WCRP News, June 2008



Prediction Capabilities

WCRP Modeling Panel

World Modeling Summit (May 2008)



- A strategy to revolutionize weather & climate prediction
- Concept of seamless prediction
- Climate Prediction Project (IGBP, WWRP, WCRP) to provide global climate information for regional adaptation and decision-making
- World Climate Research Facility to accelerate progress in operational climate prediction, building global capacity, developing a trained scientific workforce, and engage global users

The next big climate challenge
“Governments should work together to build the supercomputers needed for future predictions that can capture the detail required to inform policy”



15 March 2008

“Climate prediction is a national security issue if ever there was one”

-  2008-2013: WCRP activities and core projects implement the Strategic Framework COPES (Coordinated Observation and Prediction of Earth System)
-  Post-2013: to achieve a more effective interfacing with the users of climate informational products a new WCRP structure will be needed (JSC-29, Arcachon, France, April 2008)

Implementation

- JSC 29 reviewed WCRP progress to date and decided that in order for WCRP to remain relevant and well-funded, there would need to be an evolution, or “transition” in its activities that would reflect changing science priorities and societal needs.
- This program development was seen to take place on two time horizons – to 2013 (“the intermediate term”) and beyond (“the longer term”).
- For the intermediate term perspective the general consensus was that the strategy outlined in the COPES document is the desirable way forward.
- Consequently the JSC recommended that in the near term, crosscuts should be fully integrated in the projects’ work and all aspects of WCRP’s work should be evaluated against their contribution to the COPES strategy.

2008 ICSU-WMO-IOC-IGFA Review



Review recommendations:

- Focus and identify future research priorities
- Build scientific and resource capacity
- Enhance collaboration (national, regional, international i.e. developing countries' scientists/institutions); use national networks as 'source for nominations of under-represented groups'
- Enhance visibility and better uptake of WCRP outreach - not only at international but also regional, and national levels
- Develop framework for future joint research (i.e. with GEC programmes and ESSP)

WCRP Review (draft)

- Society needs the research that will underpin mitigation strategies and climate adaptation.
- After almost 30 years of high achievement, the breadth of WCRP programmes has outgrown the ability of society to support all the necessary research, infrastructure, and coordination. Yet the need for WCRP's work is more important than ever.
- It is clear to all that WCRP has earned renown for excellence over its lifetime of almost 30 years. This excellence provides a strong foundation for the future.
- At the same time, there must be a strategy for prioritizing WCRP science and related activities and for conversion of WCRP science into future societal benefit. The WCRP Strategic Framework document provides a framework but lacks future priorities and an implementation plan. The absence of a detailed implementation plan will make the required societal and policy relevance more difficult to achieve in the future.
- Yet it is the societal and policy relevance that will sustain the Programme in the long run and make the necessary resources easier to acquire.

WCRP Review (draft)

- WCRP should quickly develop an implementation plan for its activities, taking into account new initiatives that have emerged since the Strategic Framework was completed in 2005 as well as the observations of accelerated climate change. These changes place new demands on the science to be relevant.
- WCRP should shift its implementation paradigm from one that builds from the parts offered by Core Projects and other activities to one that has clear and focused high-level objectives and clearly articulated deliverables.
- These should be delivered primarily through WCRP-wide cross-cutting activities with the Core Projects focused on those components of the cross-cutting activities that are unique to their mandate.
- In particular, the modelling and the observing system research should be predominantly WCRP-wide activities.
- The implementation should also encourage development of process studies within the broader strategic framework rather than within individual programme components.

Future Horizons: Pre-2013



Intermediate Plan: COPEs implementation

Cross-cutting activities

Seasonal to interannual prediction
Monsoons & drought
Decadal prediction
Anthropogenic climate change
Atmospheric chemistry and climate
Climate extremes & risks
Sea-level rise
International Polar Year

Task Group on **Regional Climate Modelling and Downscaling** (ToR):

- Work on the establishment of a framework for evaluation and intercomparison of regional downscaling methods;
- Prepare a long-term vision for WCRP activities vis-à-vis regional modelling;
- Work with WMO to identify mechanisms making regional downscaling models/techniques available to scientists and users.

Responses to 2008 Review



WCRP community comments on the review:

- WCRP mandate: basic research; delivery of results should occur through multiple mechanisms/partnerships
- Too little mention of role of projects and IPOs
- WCRP/Projects have not been static but continuously evolving
- Projects' research is bottom-up driven at national level by funding agencies (rather than top-down)!
- Projects interface with users on many levels; review needs to better define 'user' groups

WCRP Response to Review Draft

- Most of those members of the WCRP community who commented on the Draft Review were not in agreement with two major aspects of the report.
- First and foremost was the sense that WCRP was static and must change to remain relevant.
- Those who commented noted that the WCRP components, and most notably the Projects, were continuously evolving and did interface with users on many levels and that the Review did not cover this.
- Indeed, reviewers were disappointed by the general lack of mention of the role of the Projects and the International Project Offices (as an extension of the WCRP secretariat).



- WCRP reviewers took issue with the statement in section 3.2, “WCRP should shift its implementation paradigm from one that builds from the parts offered by Core Projects and other activities to one that has clear and focused high-level objectives and clearly articulated deliverables.”
- This could be interpreted that the Projects were standing in the way of progress, which was felt not to be the case.
- Also there was concern that this “top down” approach would alienate the community rather generate the grass-roots support that has been a major strength and contributing factor to WCRP success.
- Reviewers noted that WCRP had no “troops” of its own to direct and that at best it could coordinate and facilitate national research efforts.
- The sense was that prioritization occurred at the national level by funding agencies and to some extent by the Projects that initiate and organize the research that is funded.

WCRP Response to Review Draft

- The issue of WCRP linking with users was the most often discussed and here it was felt there was a need to better define in the report what was meant by the term.
- Reviewers noted that there was a large spectrum of “users” of WCRP science and that in many cases, such as the different segments of the science community, the Ozone assessments and IPCC, the links were already good.
- There was general agreement that WCRP needed to identify its users and decide how, and at what level, it would deliver its research results, but it there was a strong sense that the mandate of WCRP for basic research should remain as its major focus and that the delivery of results should occur through partnerships with other groups and institutions whose job it was to provide climate services.

WCRP Response to Review Draft

- All agreed the WCRP should involve researchers from developing countries in its activities, but that funding for this should not be ad hoc as is now the case. Those who commented also agreed that increased collaboration with IGBP projects would be essential in the future.
- Reference to the Eera report was considered inappropriate since this report had not been released to the WCRP community and hence has not undergone any review process or vetting. Reviewers took issue with virtually all of what was quoted from this confidential report.

WCRP Review Findings

- **1. immediately focus the 2005 WCRP Strategic Framework to better capture the WCRP role in providing the science that underpins research on climate predictability, adaptation, and mitigation, thus strengthening the links with key end-user groups.**
- **2. rapidly implement its focused Strategic Framework, paying special attention to societal needs while maintaining its science-driven approach.**
- **3. introduce clear priorities into WCRP as a whole, collaborating with other Global Environmental Change programmes to take into account urgent science required for IPCC and other societal demands.**

WCRP Review Findings

- **4. lead the initiative on Earth system modelling, in collaboration with IGBP and other Programmes, utilizing the full richness of relevant disciplines, and explicitly addressing scientific problems that lie at the interfaces with these disciplines.**
- **5. consolidate and strengthen its focus as a user and promoter of observations as well as its support of the components of the Global Climate Observing System.**
- **6. set specific strategy and goals for building its scientific capacity in diversity of age and gender and for participation of developing country scientists in planning and research.**
- **7. build its resource capacity by enhancing support for coordination and advocacy for research and infrastructure needs. This will necessitate expanding its funding sources outside traditional targets and working through IGFA.**

WCRP Review Findings

- **8. expand its strategic outreach activities to target greater visibility and better uptake and utilization of WCRP outputs by the climate research community, the policy world and private sector, and more broadly to the general public.**
- **9. WCRP's sponsors should meet regularly to review their mutual responsibilities for the Programme in light of society's increasing need for climate understanding, mitigation, and adaptation.**
- **10. WCRP, in partnership with other global environmental change programmes, should develop a framework for future joint research operation, with the initial focus on the elements identified in this Review. A sponsor-convened 12-month study is proposed to initiate and plan the process.**



WMO/ICSU/IOC
Joint Scientific Committee (JSC) for the
World Climate Research Programme
(JSC-30)

JSC-30 Agenda: Monday, April 06, 2009

- **08:30- 09:30** Welcome, introductions, stage setting, budget outlook (A. Busalacchi and G. Asrar)
 - Dean Stephen Halperin, College of Computer, Mathematical, and Physical Sciences, University of Maryland
 - Mary Glackin, Deputy Under Secretary of Atmosphere, NOAA
 - Hosting agencies (NOAA, NASA, NSF, DoE)
- **09:30-10:45 Recent** WCRP Accomplishments 2005-2008 – J. Hurrell/T. Shepherd
- **10:45-11:00** Coffee
- **11:00-12:30** WCRP Review – A. Busalacchi/G. Asrar
- **12:30-13:30** Lunch
- **13:30-15:00** Sponsors Roundtable - Questions to be addressed:
 - WCRP's impact on your organization/programme in the past?
 - How do you see the WCRP evolving in the future in light of your organization/programme priorities?
 - What are your expectations for WCRP in the future?
 Roundtable A: D.Chen/ICSU, A. Tyagi/WMO, J. Valladares/IOC, D.Conway/CFCAS, H. Jeffrey/NERC
 Roundtable B: W. Ferrell/DoE, J. Kaye/NASA, Chet Koblinsky/NOAA-CPO, P. Stephens/NSF, S. Wilson NOAA-NESDIS
- **15:00-15:30** Risk assessment/management from the perspective of users of climate Information, S. Zebiak/IRI
- **15:30-16:00** Coffee
- **16:00-17:30** WCRP Intermediate and Long-Term Planning JSC Overview-D. Griggs
- **18:30** PCMDI 20th Anniversary Banquet Bethesda, MD (note surcharge and registration deadline on JSC-30 webpage)

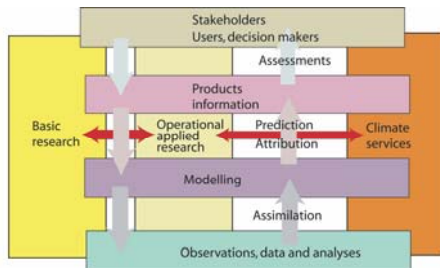
Considerations for JSC Week

- Links to user groups, attention to societal needs
- Priorities, priorities, priorities
- Path toward Earth System Modeling
- Capacity building
- Outreach
- Sponsor engagement

WCRP Vision Post-2013

- The WCRP will be based on four fundamental *interactions* of the physical climate system:
 - Ocean-atmosphere
 - Land-atmosphere
 - Stratosphere-troposphere
 - Cryospheric

- WCRP Overarching/Unifying themes:
 - Observations
 - Modeling (e.g., WGCM, WGSIP, WGNE)
 - Processes
 - *Applications*



Applications

- WCRP scientists active in planning/organizing
- WCRP will:
 - Promote climate research in the context of *climate information for decision-making*
 - ✓ WMP Modeling Summit & Model Development
 - ✓ Climate Information System Framework
 - Play a major role in the scientific/technical segment (white papers, theme leaders, etc.)
 - Engage in the policy segment which targets heads of states, ministers, senior government officials

First announcement
March 2008

**World Climate
Conference–3
(WCC-3)**

Geneva, Switzerland
31 August – 4 September 2009



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Looking to the future:

- The vision post 2013 was strongly influenced by the evolution of climate science, research, and education in the 1980's, 1990's, 2000+ across the atmosphere, ocean, land, and cryosphere.
- Looking to the future, a major envisioned challenge and opportunity at the intersection of WCRP+IGBP is the basic and applied research in support of the:
Prediction of the Earth System.
- “Propose to IGBP SC the formation of a WCRP/IGBP task team to develop a white paper discussing a strategy for predictive Earth system modeling.”