



世界気候研究計画(WCRP)の 設立意義と現状

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(WCRP JSC メンバー since 2015)

WCRP概略

- 1980年発足; WMO, ICSU, IOCがスポンサー
(+ National Contributors)
- 目的
 1. 気候の予測可能性解明
 2. 人間活動の気候影響評価
- IPCC, WMO, UNFCCC, Future Earth等への貢献

略史

- 1957-58 国際地球観測年(IGY=International Geophysical Year)
- 1979 第一回世界気候会議→WCP(World Climate Programme)
- 1980 WCPのサブプログラムとしてWCRP
発足 sponsored by WMO and
ICSU (1993:IOCもsponsorに)
- 1988 IPCC発足
- 2011 WCRP Open Science Conference
~Climate Research in Service to Society~

WCRP Structure

JOINT SCIENTIFIC COMMITTEE (JSC)

WCRP MODELLING ADVISORY COUNCIL (WMAC)

WCRP DATA ADVISORY COUNCIL (WDAC)

WORKING GROUPS ON:

SUBSEASONAL TO INTERDECADAL PREDICTION (WGSIP)
NUMERICAL EXPERIMENTATION (WGNE)

COUPLED MODELLING (WGCM)
REGIONAL CLIMATE (WGRC)

JOINT PLANNING STAFF (JPS)



CRYOSPHERE-
CLIMATE



OCEAN-
ATMOSPHERE



LAND-
ATMOSPHERE



TROPOSPHERE-
STRATOSPHERE



REGIONAL CLIMATE
DOWNSCALING

GRAND CHALLENGES

CLOUDS, CIRCULATION AND CLIMATE SENSITIVITY

REGIONAL SEA-LEVEL CHANGE AND COASTAL IMPACTS

CARBON FEEDBACKS IN THE CLIMATE SYSTEM

UNDERSTANDING AND PREDICTING WEATHER AND CLIMATE EXTREMES

NEAR-TERM CLIMATE PREDICTION

MELTING ICE AND GLOBAL CONSEQUENCES

WATER FOR THE FOOD BASKETS OF THE WORLD



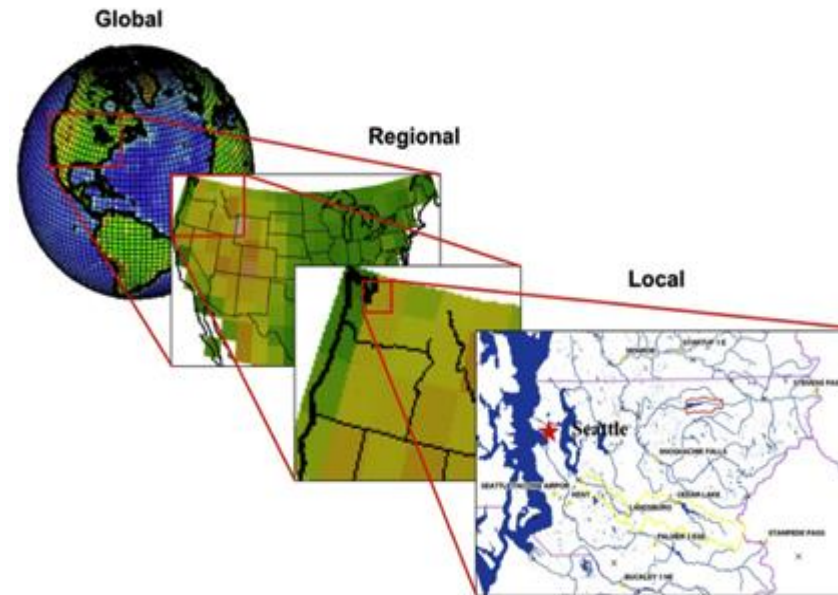
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WCRP
World Climate Research Programme

→ Advancing the science and application of regional climate downscaling, for improved regional climate information

CORDEX scientific challenges:

- **Added value** of downscaling, scales, bias and uncertainties, user-oriented metrics
- Understanding and simulating **human elements**, e.g. land use, urban development, climate and coastal cities
- Coordination of regional **coupled modeling**
- Precipitation, e.g. convective systems, monsoon
- Local wind systems



Model downscaling. NCAR dr. Andrew Wood

WCRP's Regional Approach

Climate Information for Regions

Enhancing the scientific basis to understand regional climate and its changes; identifying, quantifying and delivering high quality, reliable and accessible regional climate information

LEG 1

Foundational Climate Science
(Curiosity-driven knowledge /
Fundamental research)

Leg 1: fundamental science aiming to understand mechanisms of climate and causes of its variability/change, and to produce regional climate projections

Leg 2: research to gain the integrated knowledge or understanding necessary to inform actions and decisions

Application-inspired
Climate Science
(Research for
'actionable' knowledge)

LEG 2

Trans-disciplinary
Engagement

LEG 3

Leg 3: identify user requirements and needs that may guide research directions, and to determine the implication and relevance of climate knowledge derived from Legs 1 and 2 to applications/services.



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World Climate Research Programme

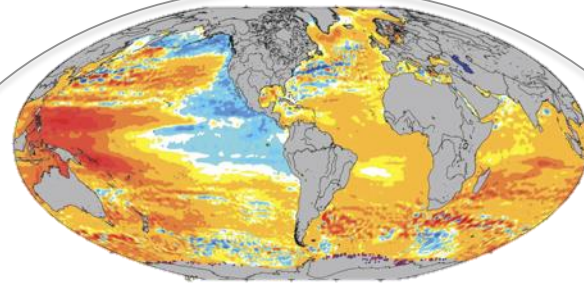
Grand challenges



Working groups



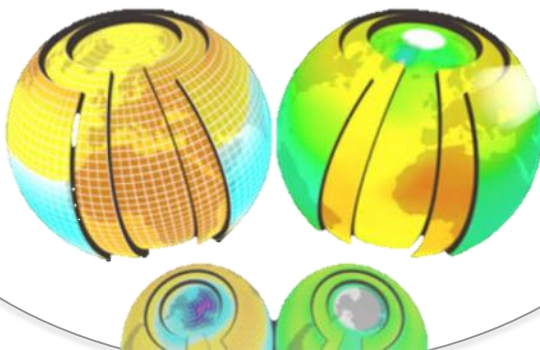
Numerical Experimentation
WGNE



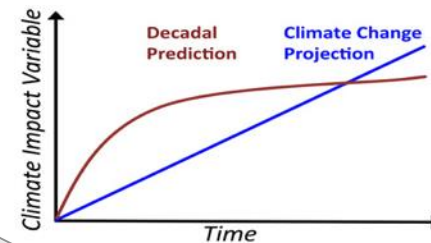
-20 0 20
Regional sea level rise (mm/yr)

Regional Climate
WGRC

WGCM
Coupled modeling

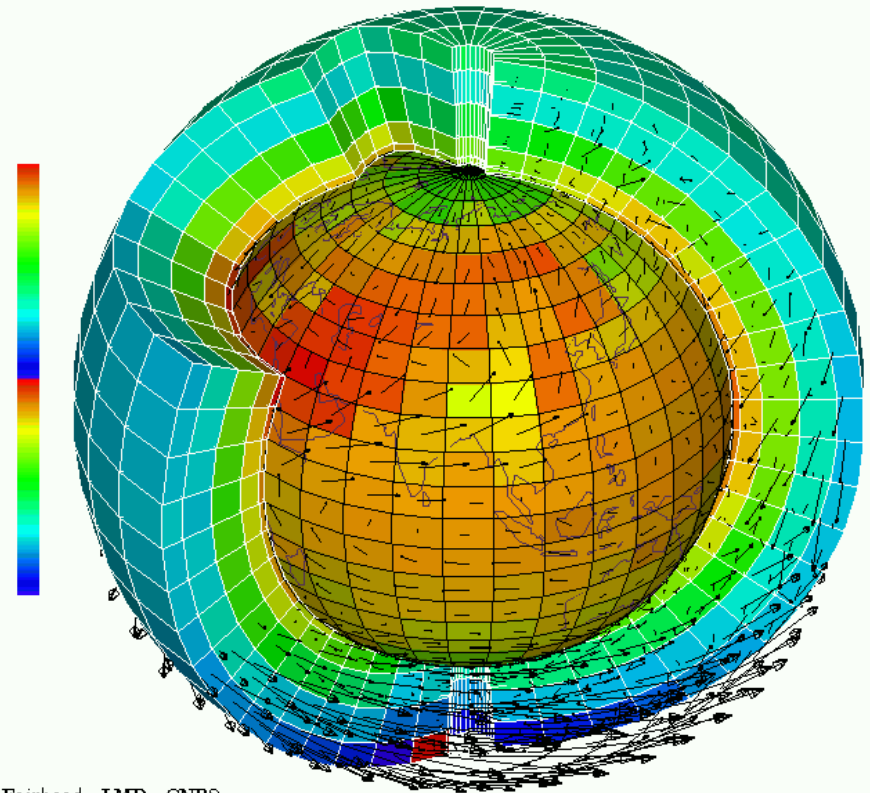


WGSIP
Subseasonal to Interdecadal
Prediction



➔ To foster the development and review of coupled climate models

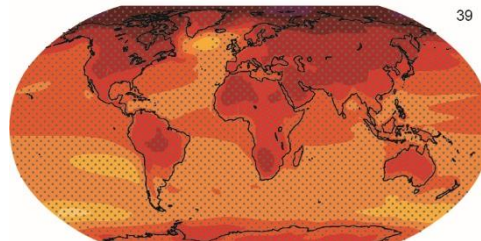
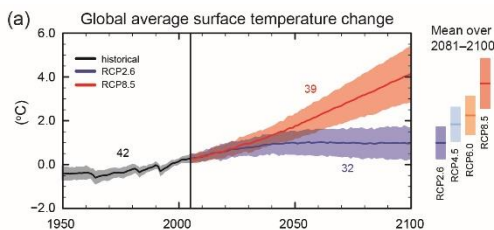
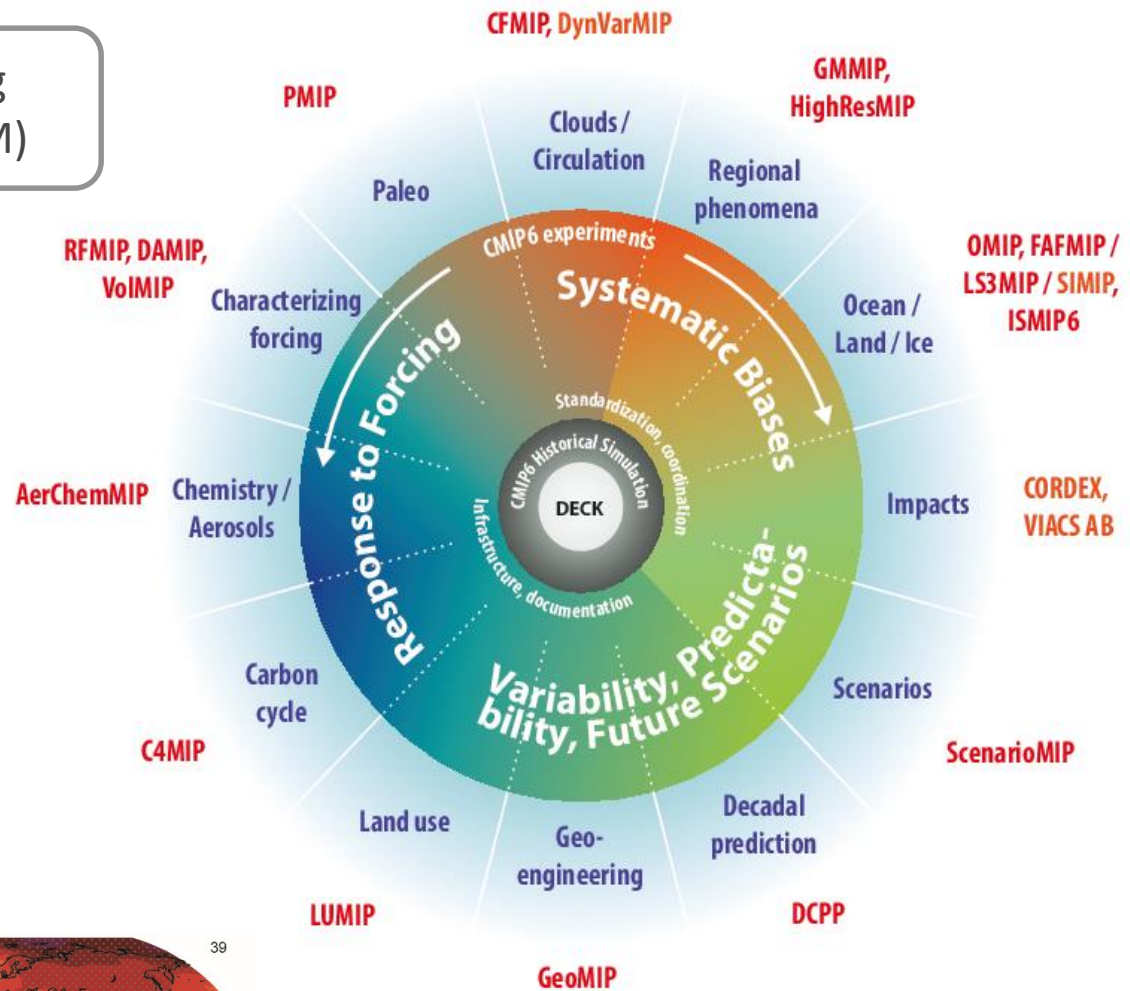
- Organisation of **model intercomparison projects (CMIP)**
- **Enhancing understanding** natural climate variability and predictability on decadal to centennial time scales
- **Enhancing predicting** the response of the climate system to changes in natural and anthropogenic forcing



CMIP is a project of WCRP's Working Group on Coupled Modeling (WGCM)

CMIP has led to an improved understanding of past, present and future climate change and variability in a multi-model framework

CMIP defines common experiment protocols, forcings and output



21 CMIP6-Endorsed MIPs

大きな我が国の貢献

- WCRP合同科学者会議: 1委員(1995～)
- コアプロジェクト、グランドチャレンジ課題、サブパネル等に延べ35名の日本人委員(うちco-chair, co-leader=7名)
- WCRPの研究はIPCC評価報告書の基盤(第5次: 日本人執筆者・査読者=30名)
- 気象現業、気象研究、ひまわり8、9号
- 気候研究:
 - JRA-55気候再解析データセット、
 - 地球シミュレータ、京コンピュータ
- 地球観測衛星: TRMM, AMSR-E, GOSAT, GCOM/W...
- 海洋観測: TAO-TRITONブイシステム、ARGOブイネットワーク、研究船
- GAME, CEOP, MAHASRI等アジアモンスーン、水循環研究を主導
- 極域研究
- Future Earth: アジアからの貢献