The Victorian Climate Initiative: VicCI

Bertrand Timbal

Centre for Australian Weather and Climate Research
Bureau of Meteorology

Australian Government
Bureau of Meteorology

CSIRO

The Centre for Australian Weather and Climate Research
A partnership between CSIRO and the Bureau of Meteorology

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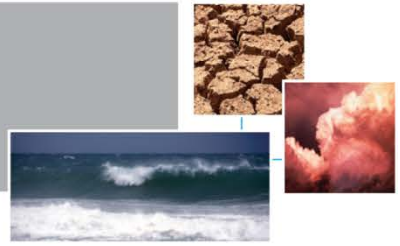
Overview of VicCI : rationale



- Restart where SEACI ended: continuing a success story
- Smaller program: more targeted focus
- Interface of climate and hydrology
- Driven by user needs (water planning)
- Physical understanding, Predictability, Models assessment
- Prediction (year to multi-year), Projection (decadal to secular)
- Climate variability on multi-time scales

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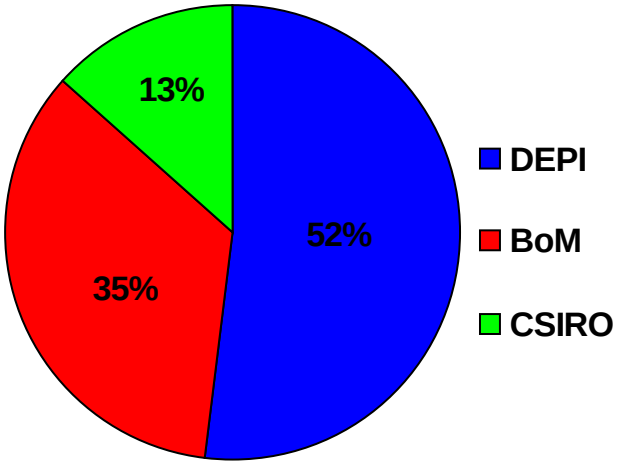
Overview of VicCI: key elements



- 3 years research initiative
- 3.7 Millions AU$
- Department of Environment and Primary Industries
- 2 research organisations: BoM and CSIRO
- 2-tiers governance:
  - Steering Committee (SC) (DEPI, BoM)
  - Program Management Committee (PMC)
    (DEPI, BoM, CSIRO, 2 independent experts)

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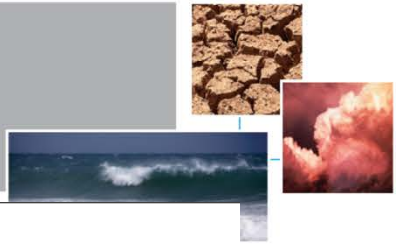
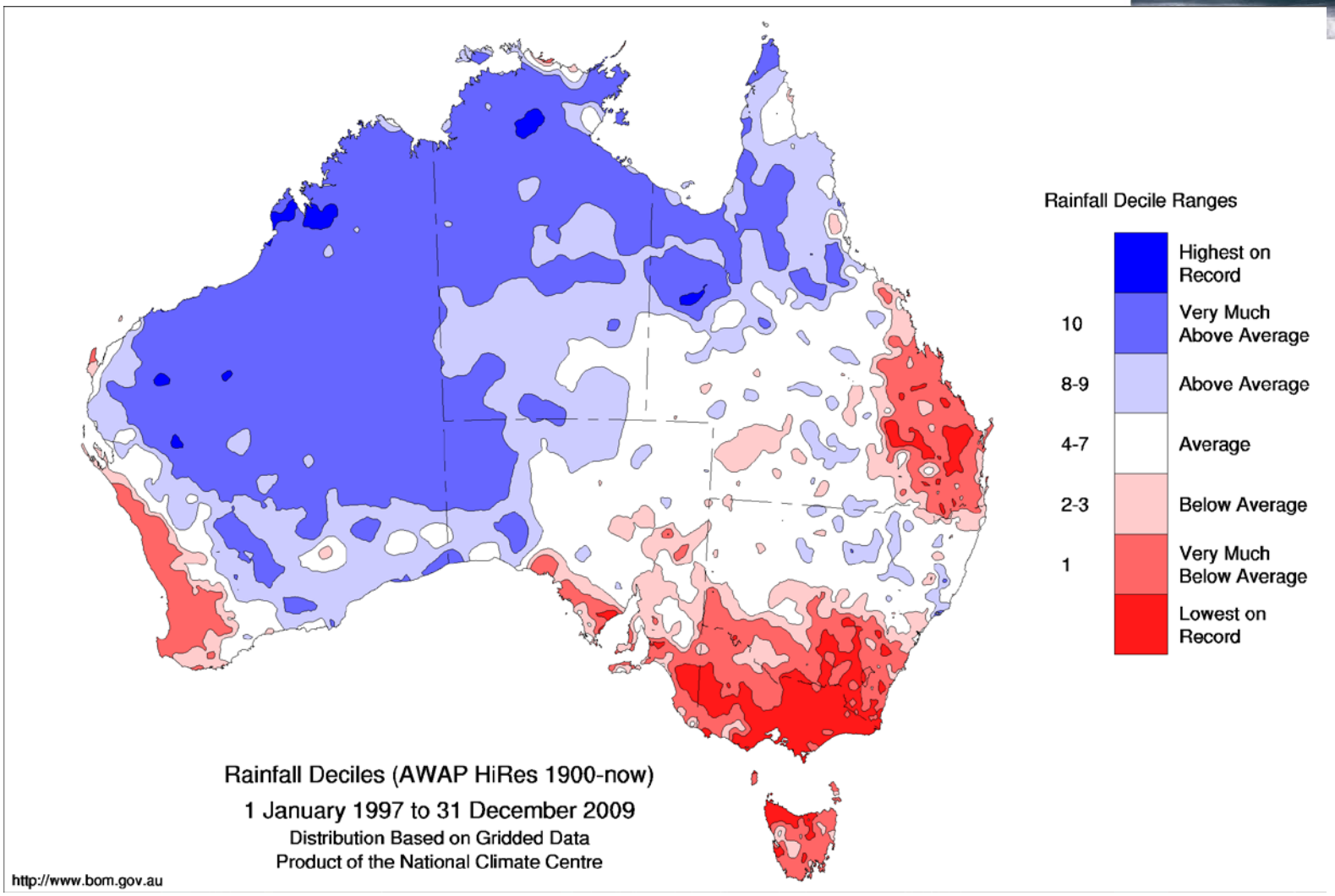
The Millennium Drought (1997-2009)





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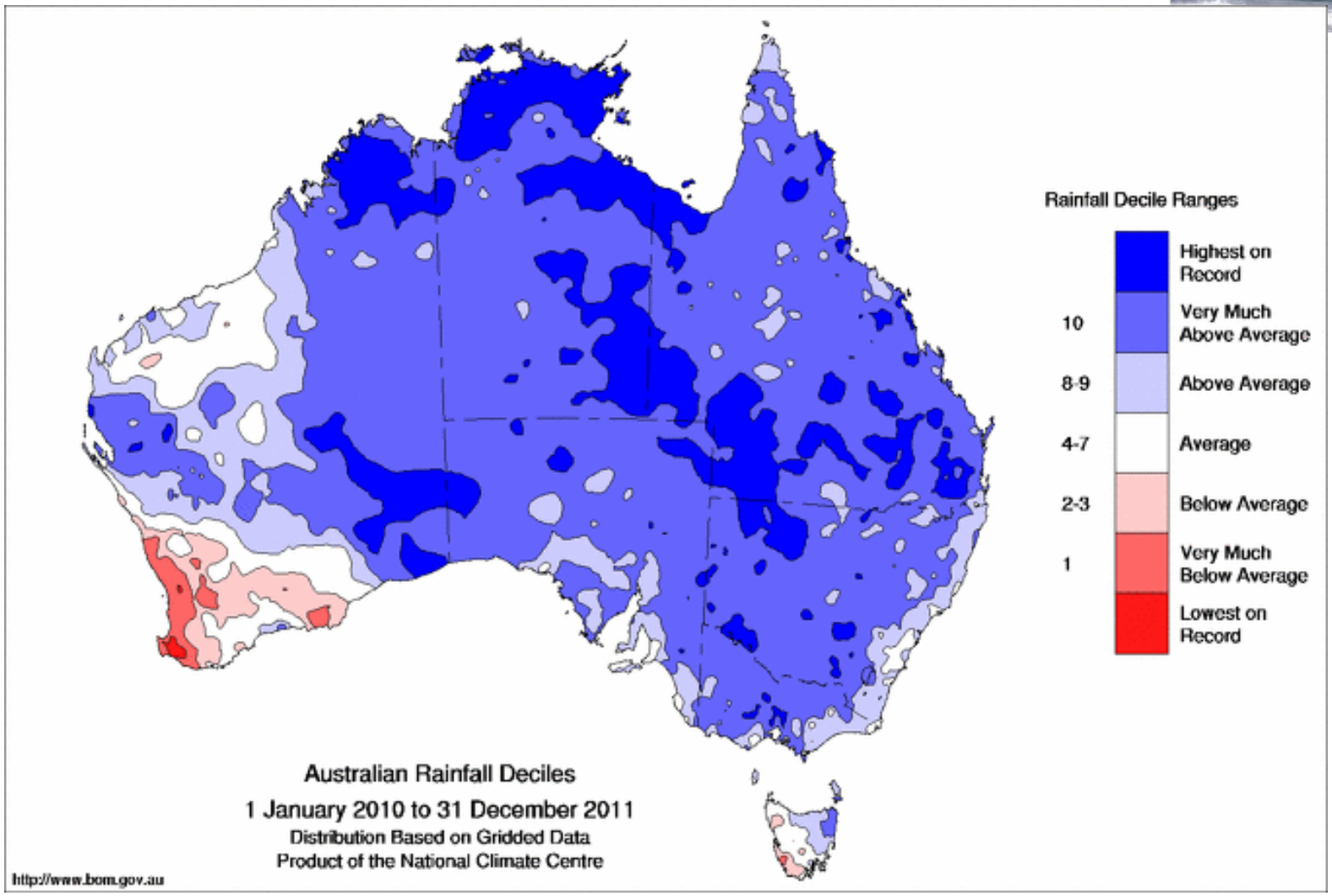
La Niñas of 2010-11 and 2011-12



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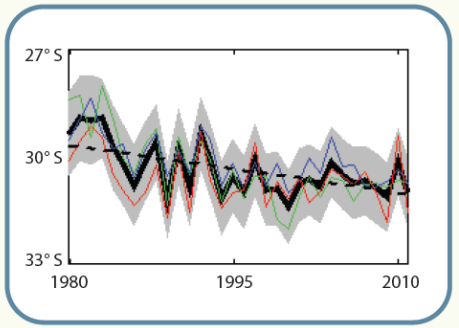
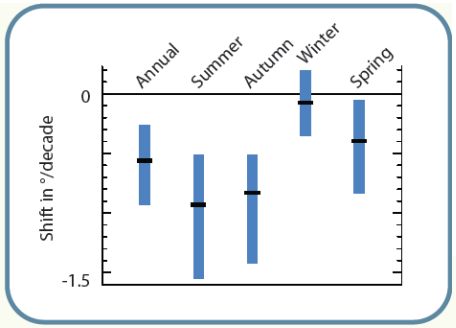
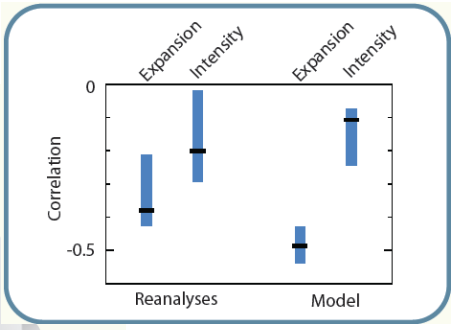
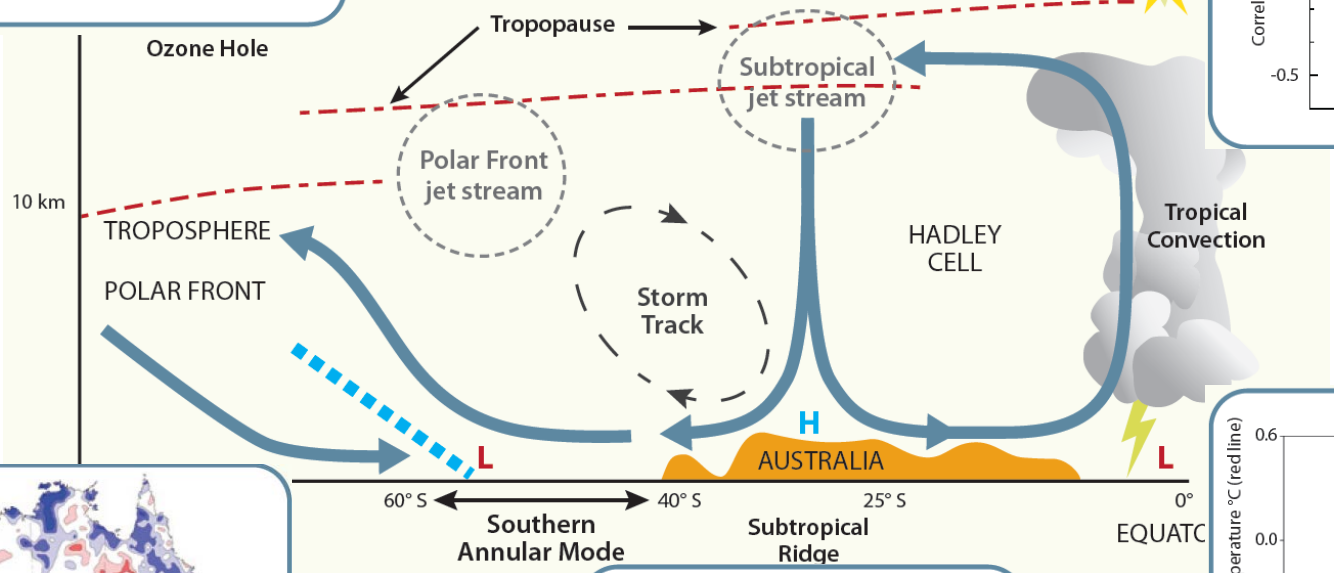
Mean Meridional Changes and their impacts

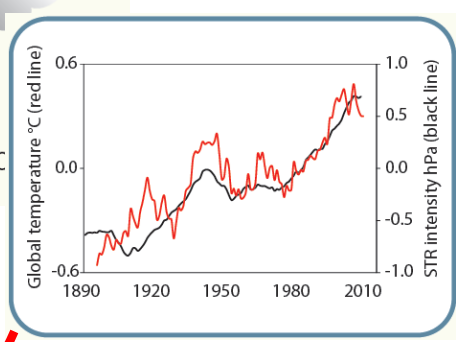


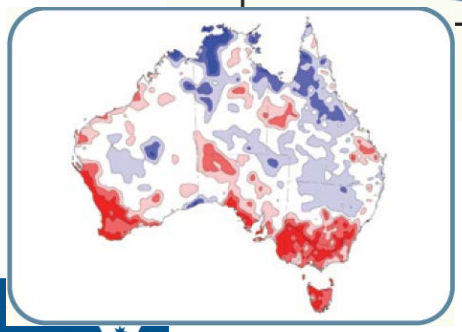
Ozone Hole

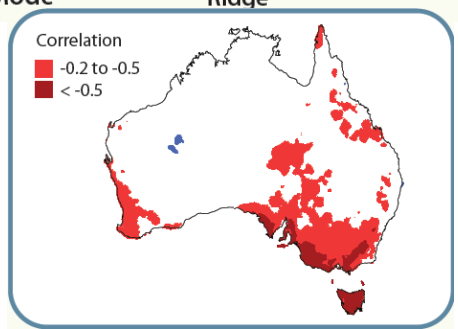












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Overview of VicCI: 7 projects

Knowledge scale

Physical understanding

GCMs

Downscaling

Hydrological applications

Relevance scale

Tropical and extra-tropical interactions

Understanding Mean Meridional Circulation

Multi year predictability & predictions

Attribution of observed changes

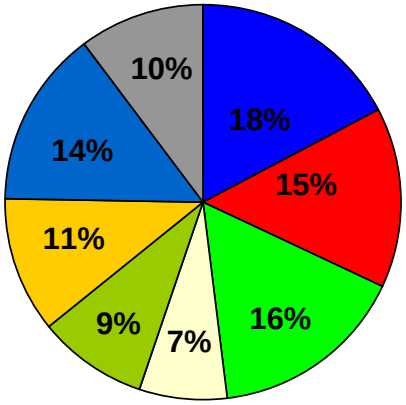
Inter-pretation of the GCM projec-tions

High resolution modelling of extremes

Downscaling and hydrological applications

Day | Season | Multi year | Decade | Century

Time scale



- P1: Multi year predictability & predictions
- P2: Changes in Mean Meridional Circulation
- P3: Tropical-extratropical interactions
- P4: Attribution of recent observed changes
- P5: Interpretation of GCMs' future projections
- P6: High resolution modelling of extremes
- P7: Downscaling & Hydrological applications
- Governance - Management - Communication

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Project 1

Multi year predictability & predictions:

- Team (BoM): Harry Hendon (PI), Eun-Pa Lim
  Guo Liu, Jing-Jia Luo

- Diagnose Decadal Change in ENSO;
  impact on predictability
- Explore impact of SST warming on extreme such as the
  La Nina in 2010

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Project 2

Observed changes in the Mean Meridional Circulation:

- Team (BoM): Bertrand Timbal (PI), Faina Tseitkin
  Chris Lucas, Hanh Nguyen, Laurie Rikus

- Develop new method to evaluate the Hadley Circulation within the Australian region
- Evaluate relationship between several metrics of elements forming part of the HC

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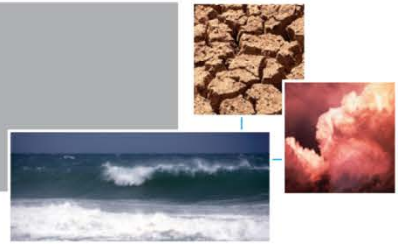
Project 3

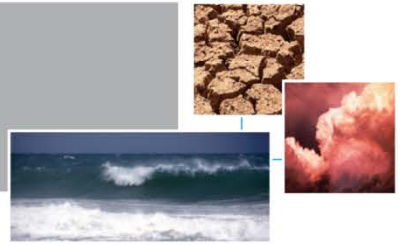


Tropical-extratropical interactions:

- Team (BoM): Harry Hendon (PI), Hanh Nguyen, Eun-Pa Lim, Chris Lucas

- Analyse the MMC using an isentropic approach
- Investigate relationship between SAM and ENSO

Project 4

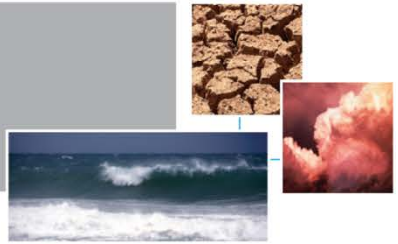


Attribution of recent observed changes:

- Team (BoM): Bertrand Timbal (PI), Faina Tseitkin
  Chris Lucas, Hanh Nguyen

- Attribute observed tropical expansion to individual climate forcings (NH vs. SH contrast)
- Analyse HC expansion in CMIP5 simulations with anthropogenic and natural forcings

Project 5

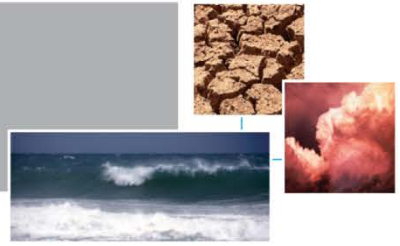


Interpretation of GCMs' future projections:

- Team: Bertrand Timbal (PI, BoM), Yang Wang (BoM)
  Dewi Kirono (CSIRO), Janice Bathols (CSIRO)

- Inform VicCI of results from the NRM program relevant to Victoria
- Evaluate CMIP5 projections in respect to key features: STR changes and Indo-Pacific tropical warming

Project 6



High resolution modelling of extremes:

- Team : Marie Ekstrom (PI, CSIRO)

- Set-up of the WRF model
  - Code on NCI
  - Model domain and size
  - Fine resolution surface data
  - Sensitivity to boundary layer and micro-physics schemes

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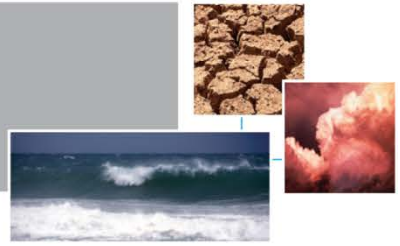
Project 7



Downscaling & Hydrological applications:

- Team: Jin Teng (PI, CSIRO), Bertrand Timbal (BoM), Yang Wang (BoM)

- Investigate simple rainfall-runoff relationship in high yield catchment using high resolution gridded observations
- Review of possible bias corrections techniques needed to applied to downscaled rainfall series

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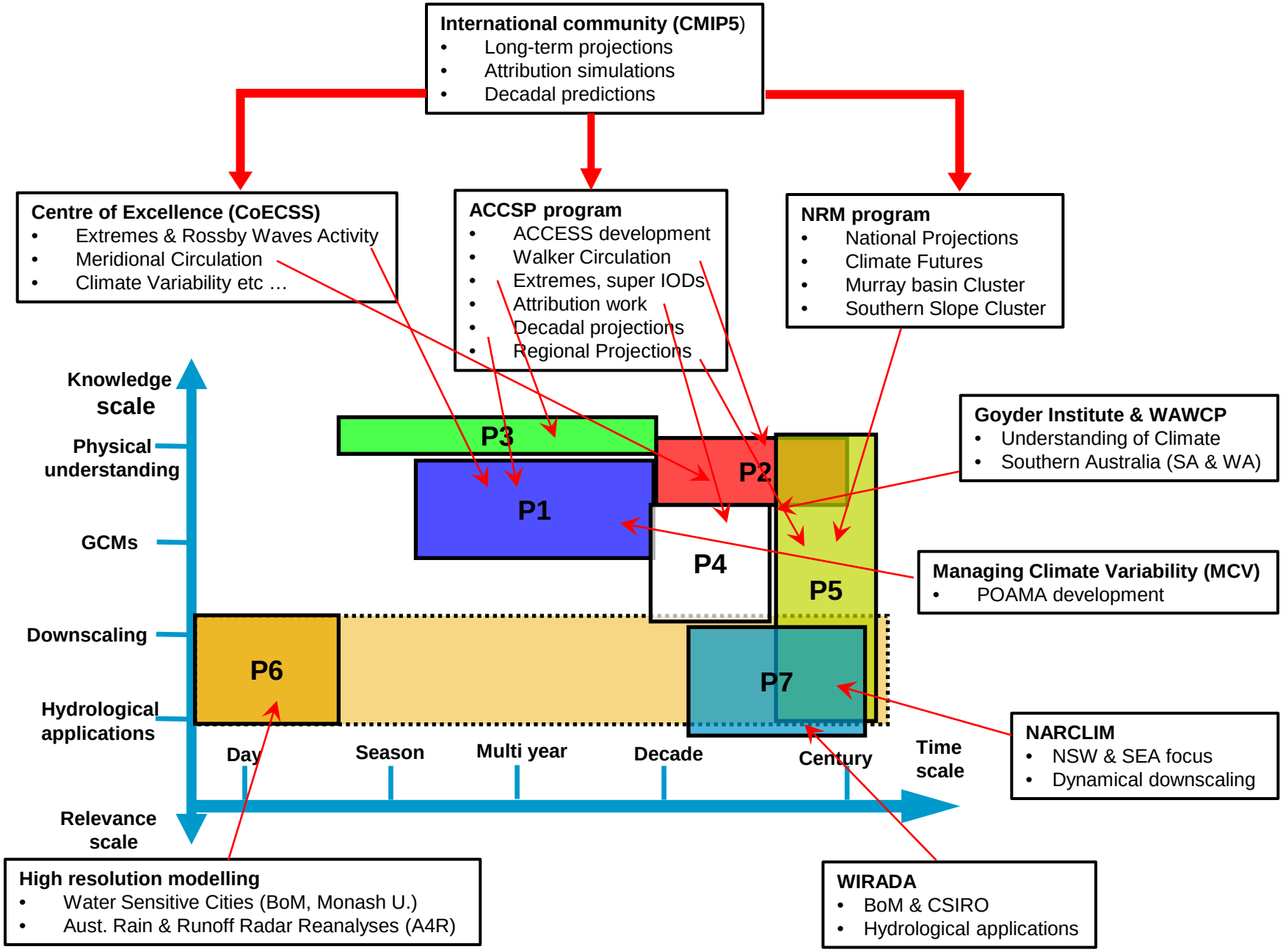
International community (CMIP5)
• Long-term projections
• Attribution simulations
• Decadal predictions
Centre of Excellence (CoECSS)
• Extremes & Rossby Waves Activity
• Meridional Circulation
• Climate Variability etc …
ACCSP program
• ACCESS development
• Walker Circulation
• Extremes, super IODs
• Attribution work
• Decadal projections
• Regional Projections
NRM program
• National Projections
• Climate Futures
• Murray basin Cluster
• Southern Slope Cluster
Goyder Institute & WAWCP
• Understanding of Climate
• Southern Australia (SA & WA)
Managing Climate Variability (MCV)
• POAMA development
NARCLIM
• NSW & SEA focus
• Dynamical downscaling
WIRADA
• BoM & CSIRO
• Hydrological applications
High resolution modelling
• Water Sensitive Cities (BoM, Monash U.)
• Aust. Rain & Runoff Radar Reanalyses (A4R)
Knowledge scale
Physical understanding
GCMs
Downscaling
Hydrological applications
Relevance scale
P1
P2
P3
P4
P5
P6
P7
Day
Season
Multi year
Decade
Century
Time scale