Challenges and opportunities in preparing a regional Atlas: **consistency in the provision of regional climate information from multiple methods**

José M. Gutiérrez

IPCC Expert Meeting on Assessing Climate Information for the Regions, ICTP, Trieste, Italy, 16-18 May 2018

1. Challenges (and expectations) (and open issues) from the Atlas …

1. Challenges (and expectations) (and open issues) from the Atlas …

2. Multi-MIP Distillation and conflicting information

3. Data, Metadata and reproducibility

2. Multi-MIP Distillation

For an interim period:

CMIP5 + CORDEX-CMIP5

Then

CMIP6 + CORDEX-CMIP5 + CORDEX-CMIP6

2. Multi-MIP Distillation

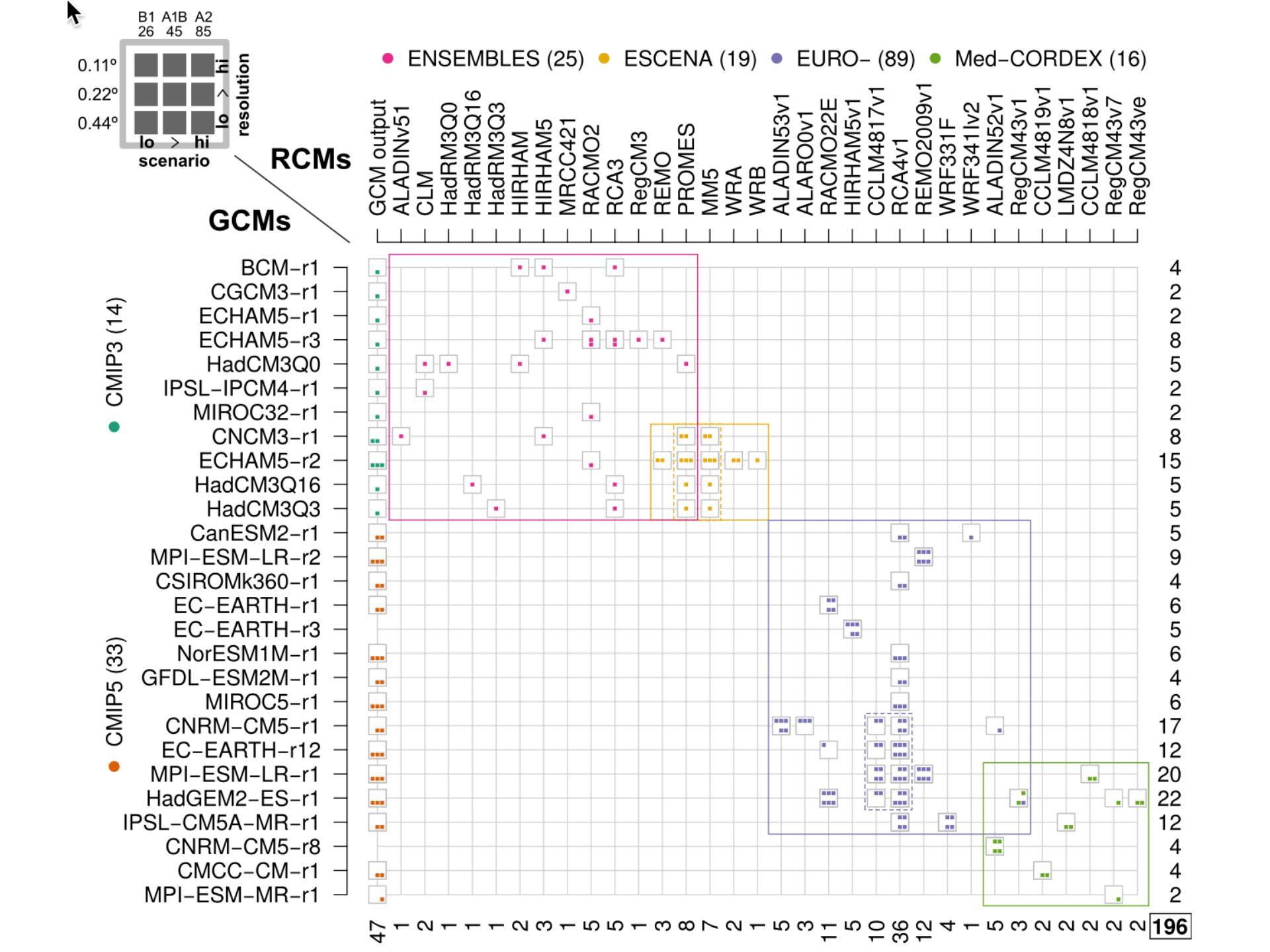
For an interim period:

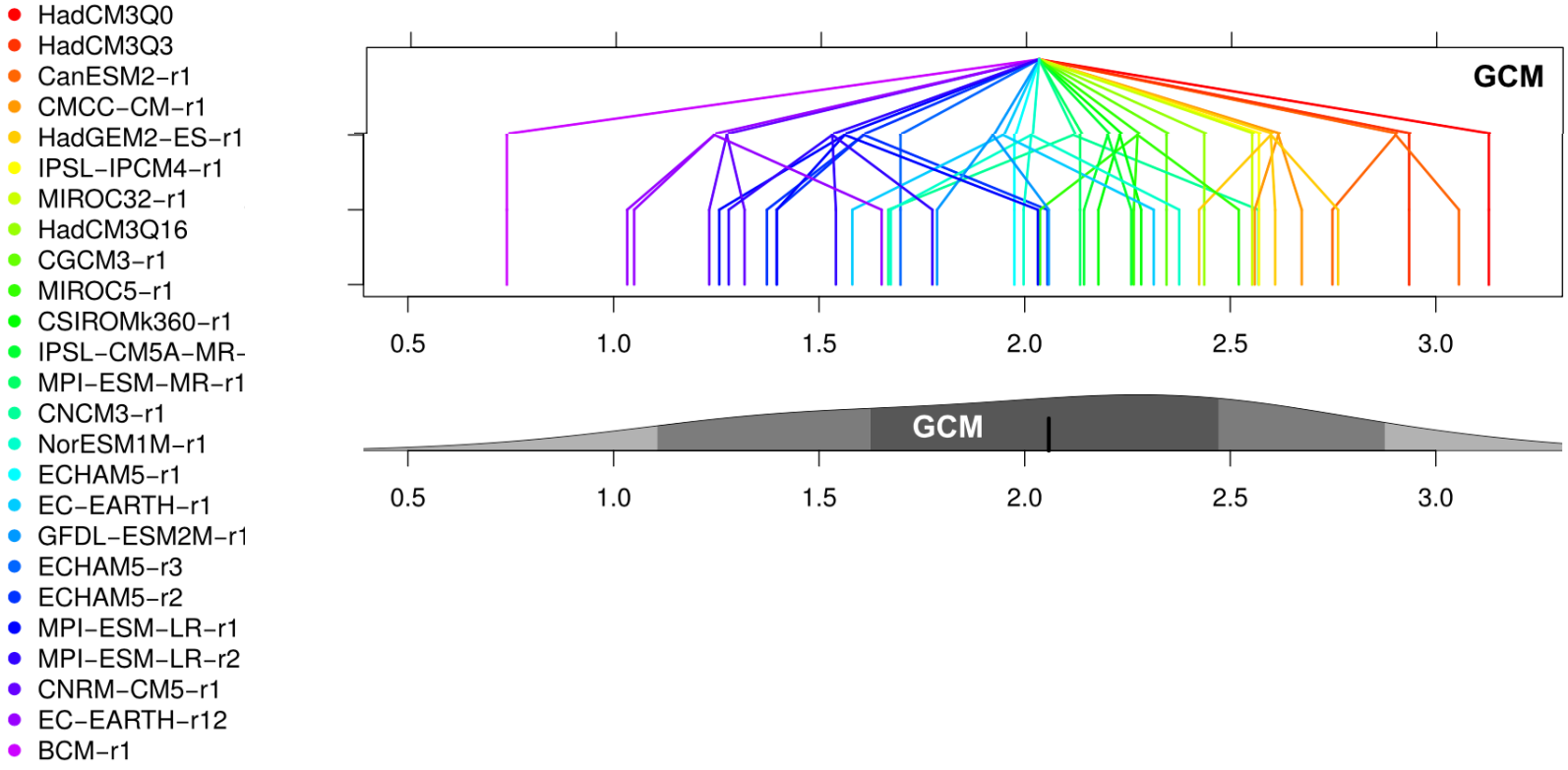
CMIP5 + CORDEX-CMIP5

Then

CMIP6 + CORDEX-CMIP5 + CORDEX-CMIP6

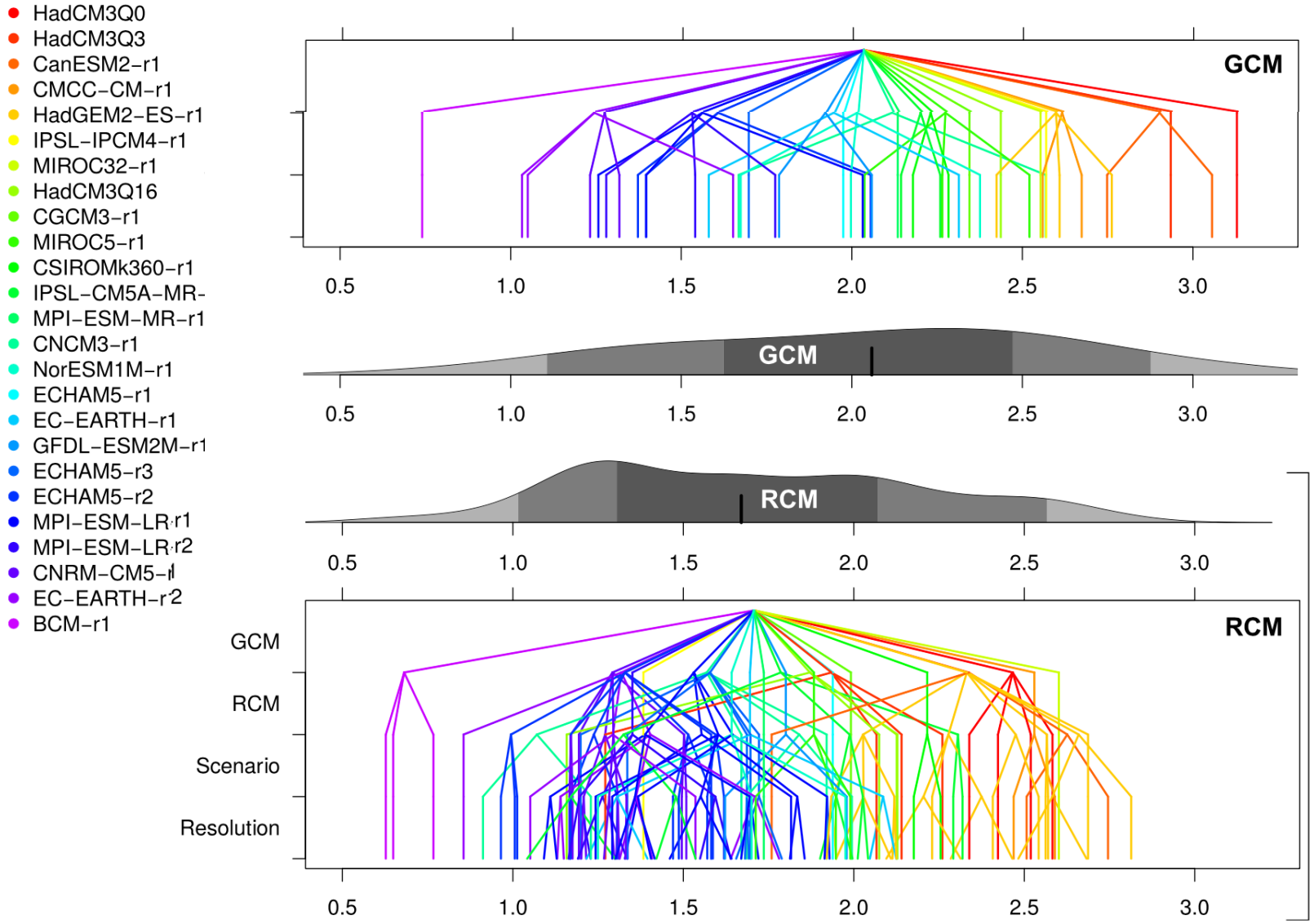
Some experiences (no solutions) from


B1 A1B A2
26 45 85
0.11°
0.22°
0.44°
lo > hi
scenario
lo > hi
resolution
RCMs
GCMs
ENSEMBLES (25)
ESCENA (19)
EURO− (89)
Med−CORDEX (16)
GCM output
ALADINv51
CLM
HadRM3Q0
HadRM3Q16
HadRM3Q3
HIRHAM
HIRHAM5
MRCC421
RACMO2
RCA3
RegCM3
REMO
PROMES
MM5
WRA
WRB
ALADIN53v1
ALARO0v1
RACMO22E
HIRHAM5v1
CCLM4817v1
RCA4v1
REMO2009v1
WRF331F
WRF341v2
ALADIN52v1
RegCM43v1
CCLM4819v1
LMDZ4N8v1
CCLM4818v1
RegCM43v7
RegCM43ve
CMIP3 (14)
BCM−r1
CGCM3−r1
ECHAM5−r1
ECHAM5−r3
HadCM3Q0
IPSL−IPCM4−r1
MIROC32−r1
CNCM3−r1
ECHAM5−r2
HadCM3Q16
HadCM3Q3
CMIP5 (33)
CanESM2−r1
MPI−ESM−LR−r2
CSIROMk360−r1
EC−EARTH−r1
EC−EARTH−r3
NorESM1M−r1
GFDL−ESM2M−r1
MIROC5−r1
CNRM−CM5−r1
EC−EARTH−r12
MPI−ESM−LR−r1
HadGEM2−ES−r1
IPSL−CM5A−MR−r1
CNRM−CM5−r8
CMCC−CM−r1
MPI−ESM−MR−r1
4 2 2 8 5 2 2 8 15 5 5 5 9 4 6 5 6 4 6 17 12 20 22 12 4 4 2
47 1 2 1 1 1 2 3 1 5 5 1 3 8 7 2 1 5 3 11 5 10 36 12 4 1 5 3 2 2 2 2 2
196



Fernández et al. (2018) Consistency of climate change projections from multiple global and regional model intercomparison projects. Clim Dyn.

(after Ed Hawkins, Climate Lab Book)



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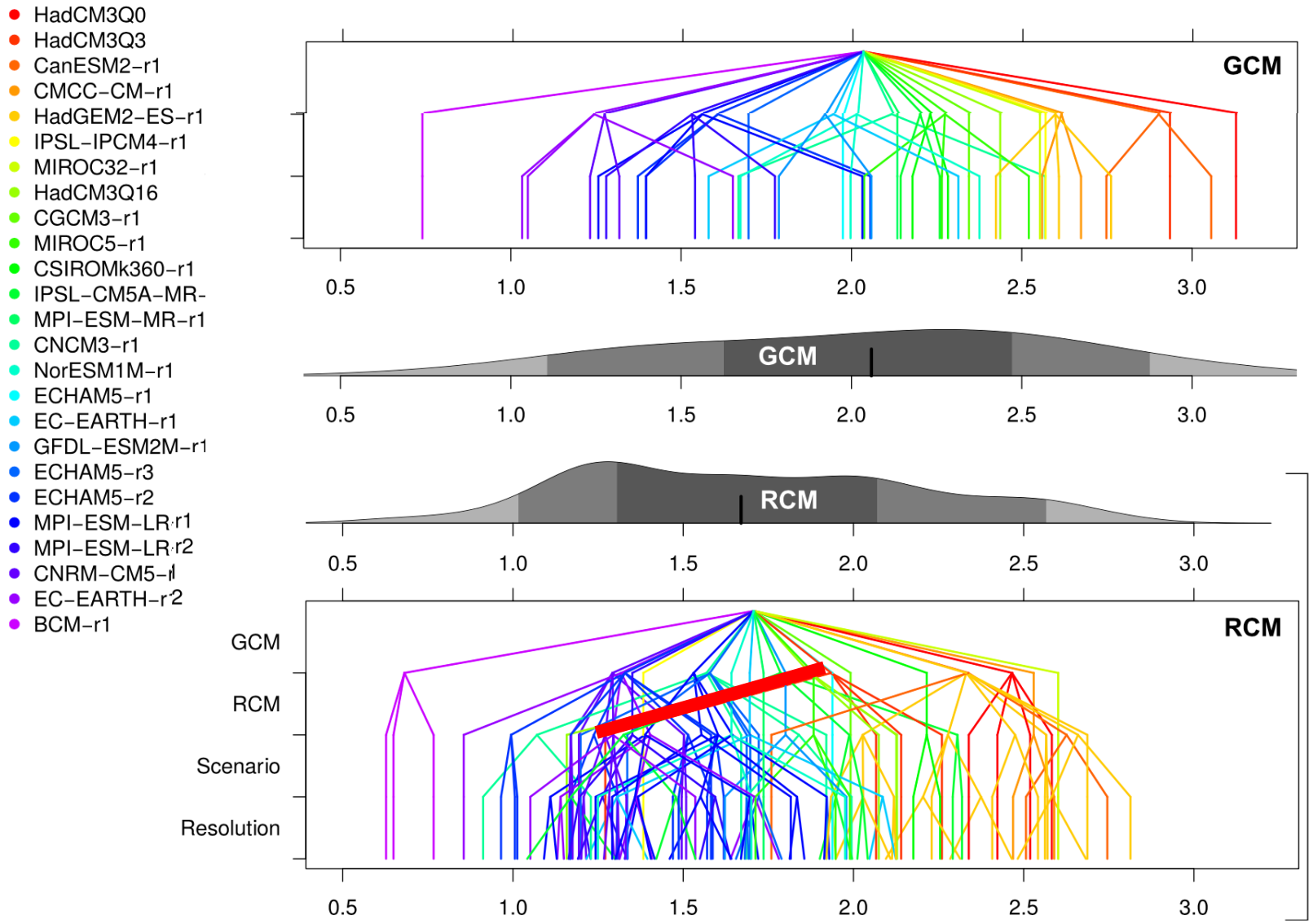

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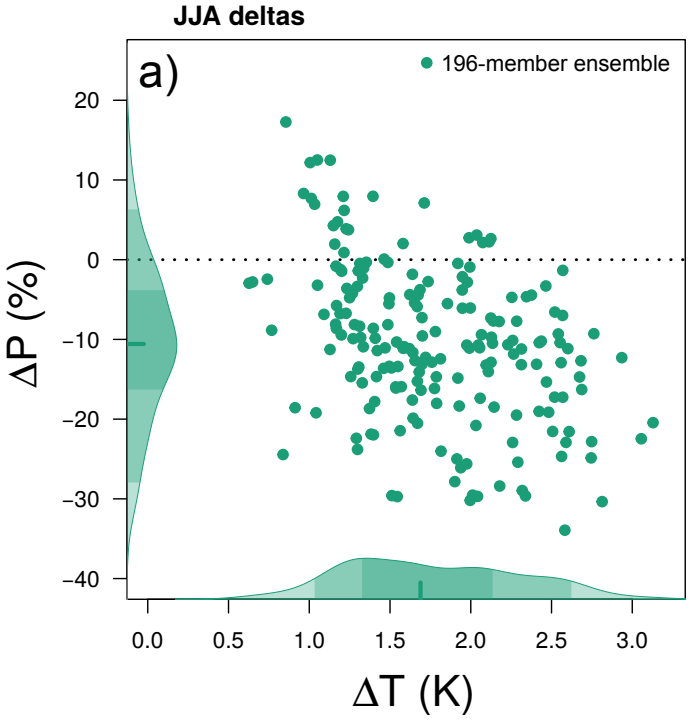
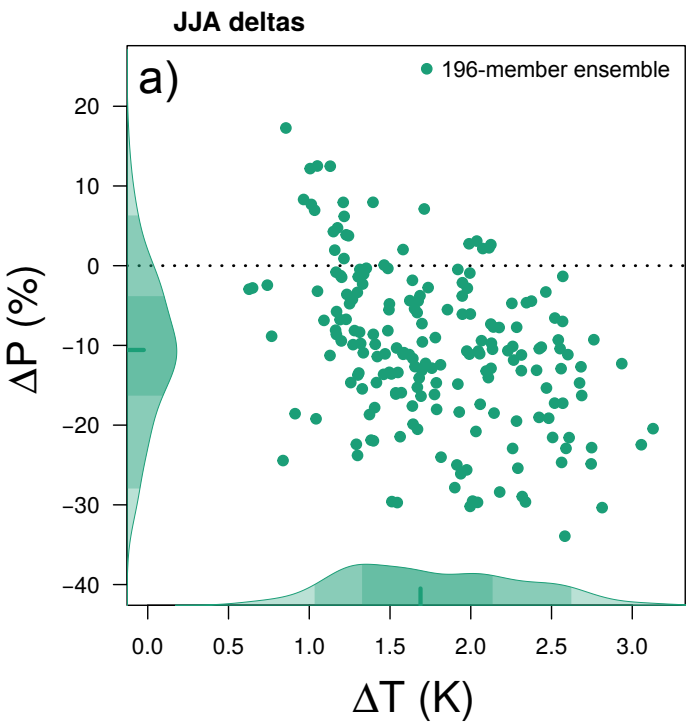

JJA deltas
a)
196-member ensemble
20
10
0
−10
−20
−30
−40
ΔP (%)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
ΔT (K)


JJA deltas
a)
196-member ensemble
20
10
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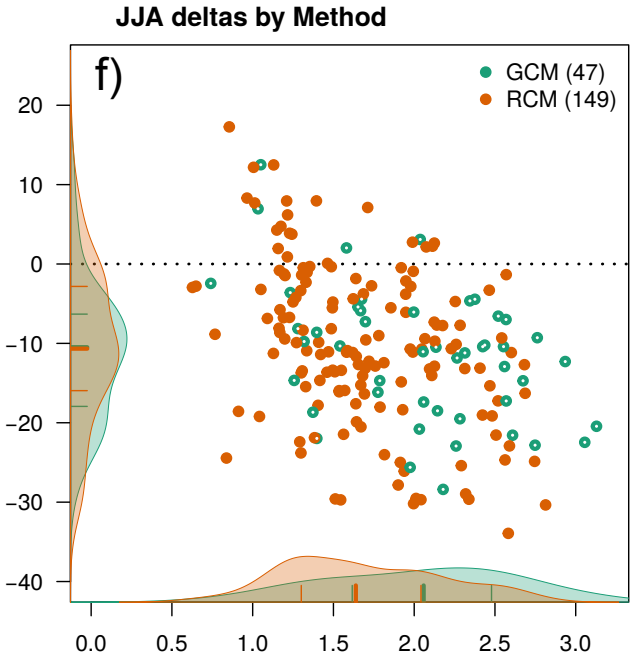
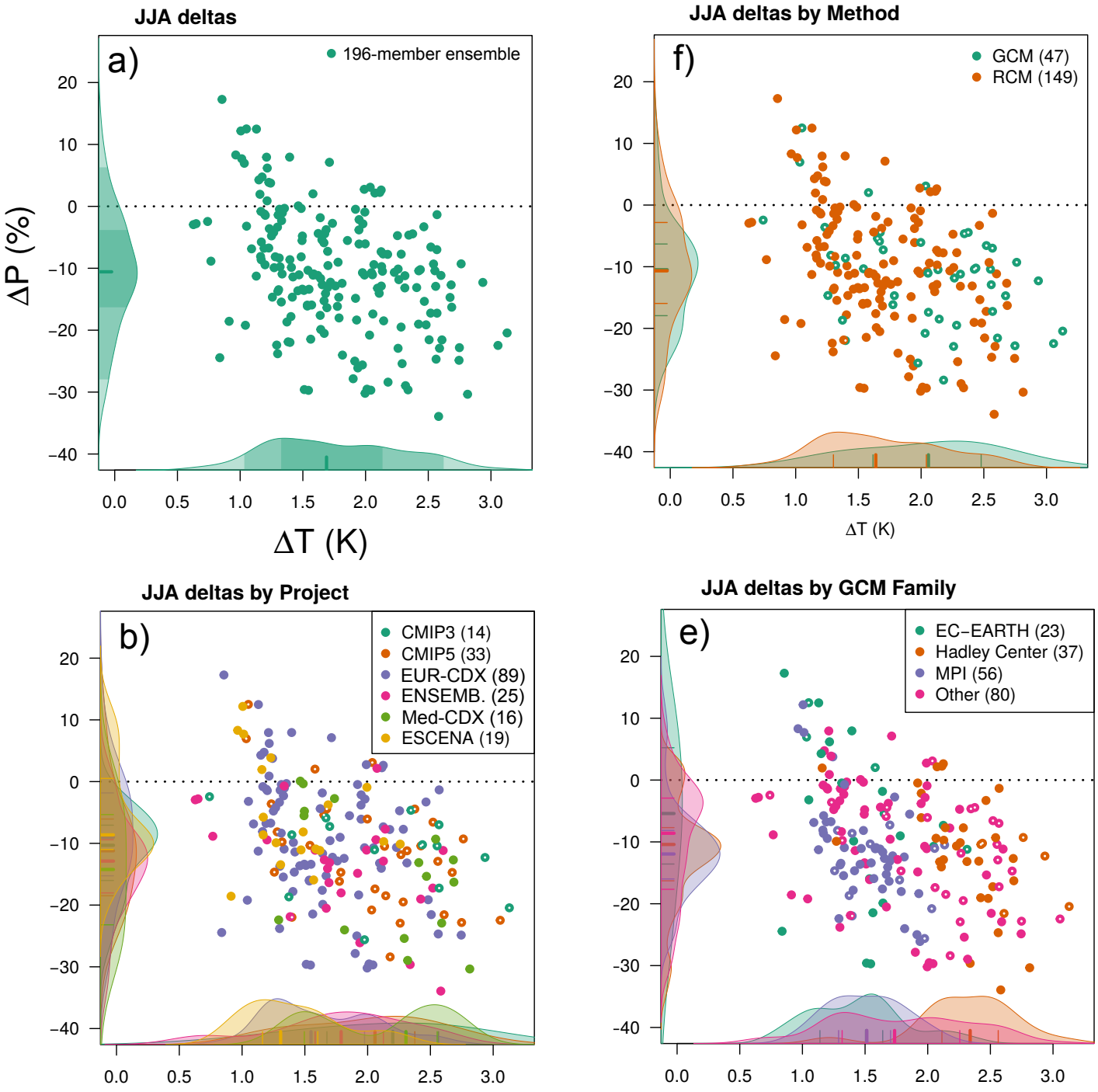
−40
ΔP (%)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
ΔT (K)


JJA deltas by Method
f)
GCM (47)
RCM (149)
20
10
0
−10
−20
−30
−40
0.0
0.5
1.0
1.5
2.0
2.5
3.0

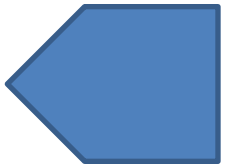

JJA deltas
a)
196-member ensemble
ΔP (%)
ΔT (K)
JJA deltas by Method
f)
GCM (47)
RCM (149)
ΔT (K)
JJA deltas by Project
b)
CMIP3 (14)
CMIP5 (33)
EUR-CDX (89)
ENSEMB. (25)
Med-CDX (16)
ESCENA (19)
JJA deltas by GCM Family
e)
EC−EARTH (23)
Hadley Center (37)
MPI (56)
Other (80)

3. Data, metadata (and reprod.)

Data:

IPCC Data Distribution Center

WGI dataset (*ETHZ*)



TGICA Task Group

3. Data, metadata (and reprod.)

Data: **IPCC Data Distribution Center**

WGI dataset (*ETHZ*)

TGICA Task Group

Need for Metadata (taken from yesterday's BOG minutes):

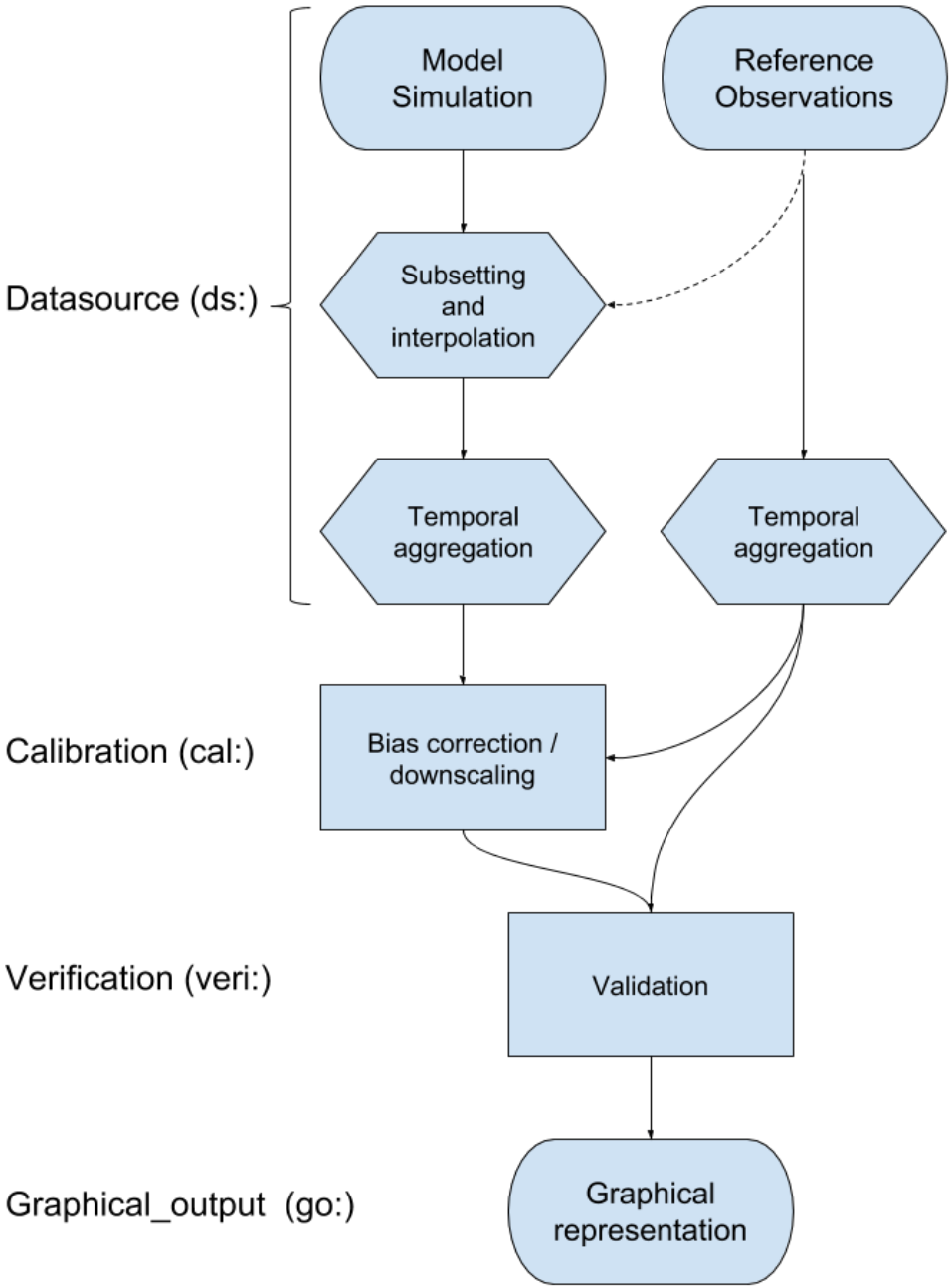
Background information on how maps/figures/illustrations in atlas were developed to be provided in chapters.

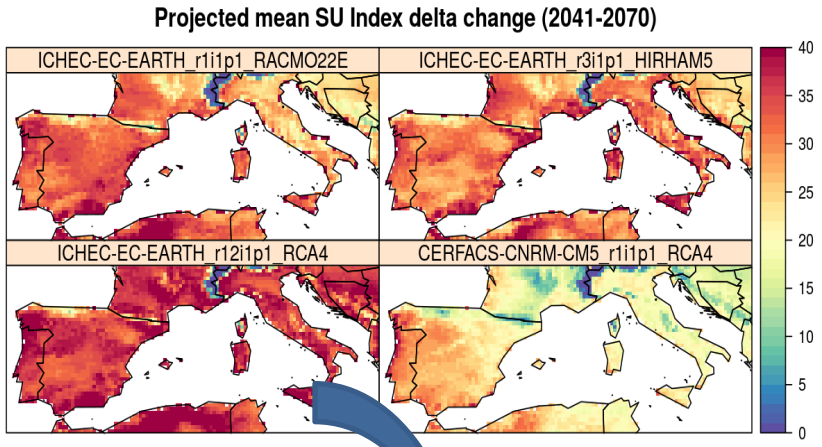
… and also for reproducibility

Baker, M., 2016. 1,500 scientists lift the lid on reproducibility. Nature News 533, 452.

Public domain tools:

And standards …

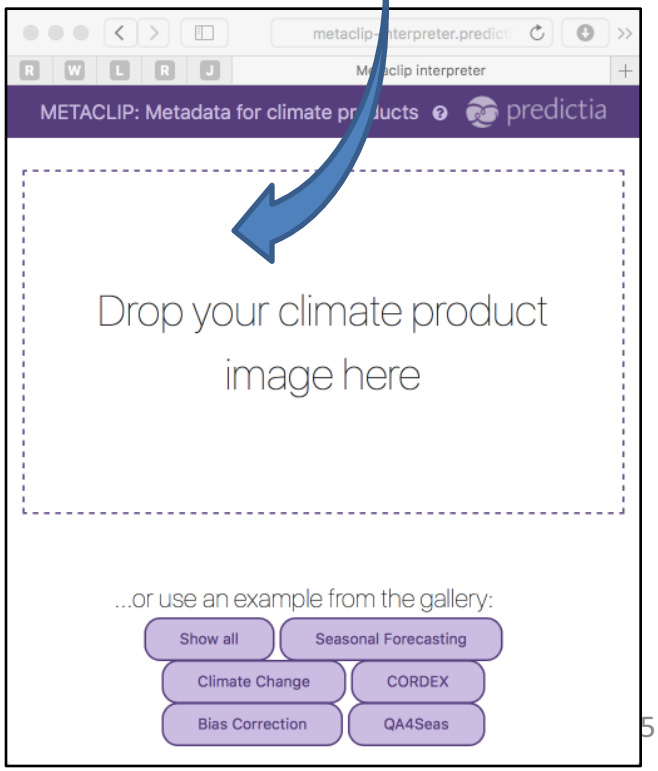

Model Simulation
Reference Observations
Subsetting and interpolation
Temporal aggregation
Temporal aggregation
Bias correction / downscaling
Validation
Graphical representation
Datasource (ds:)
Calibration (cal:)
Verification (veri:)
Graphical_output (go:)


Projected mean SU Index delta change (2041-2070)
ICHEC-EC-EARTH_r1i1p1_RACMO22E
ICHEC-EC-EARTH_r3i1p1_HIRHAM5
ICHEC-EC-EARTH_r12i1p1_RCA4
CERFACS-CNRM-CM5_r1i1p1_RCA4
40
35
30
25
20
15
10
5
0


JPG

+


R D F


METACLIP: Metadata for climate pr ucts
predictia
Drop your climate product image here
...or use an example from the gallery:
Show all
Seasonal Forecasting
Climate Change
CORDEX
Bias Correction
QA4Seas

METACLIP: Metadata for climate products

predictia

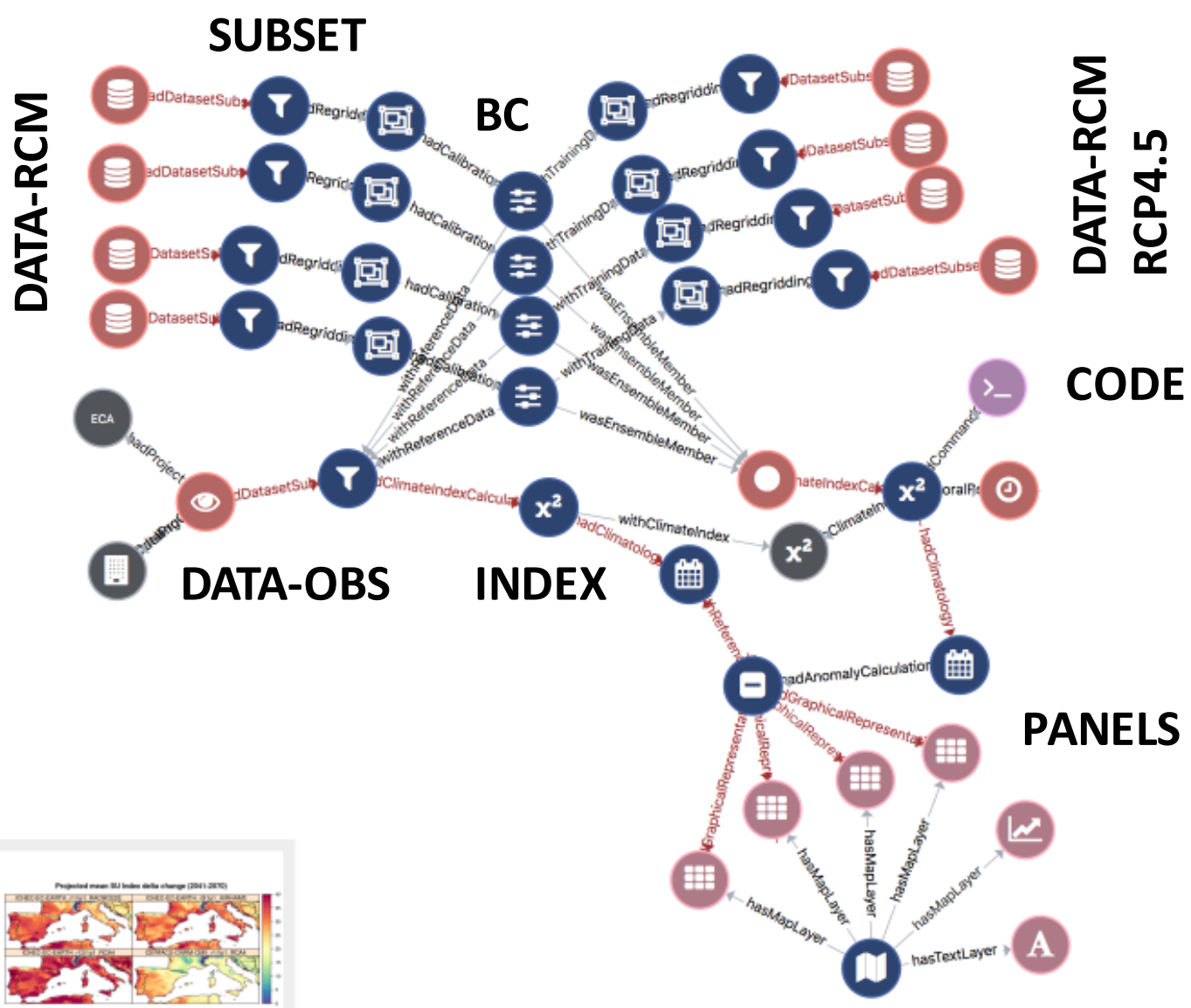
- Home
- Graph restart
- Layout-image export
- Fit graph to window

Node:
ClimateIndexCalculation

Instance of:
ds:ClimateIndexCalculation

Relationships:

- ds:hadCommandCall
  - from climdexGrid
- ds:withClimateIndex
  - from ClimateIndex.SU
- ds:hadClimatology
  - from Climatology
- ds:hasTemporalResolution
  - from TemporalResolution
- ds:hadClimateIndexCalculation
  - to Multi-modelEnsemble



METACLIP: Metadata for climate products

predictia

Home

Graph restart

Layout-image export

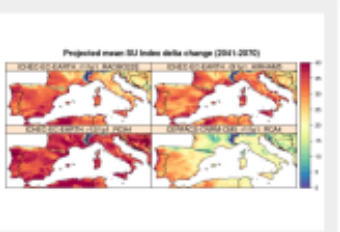
Fit graph to window

Node:
EUROCORDEX44_ICHEC-EC-EARTH_r12i1p1_RCA4_v1_rcp

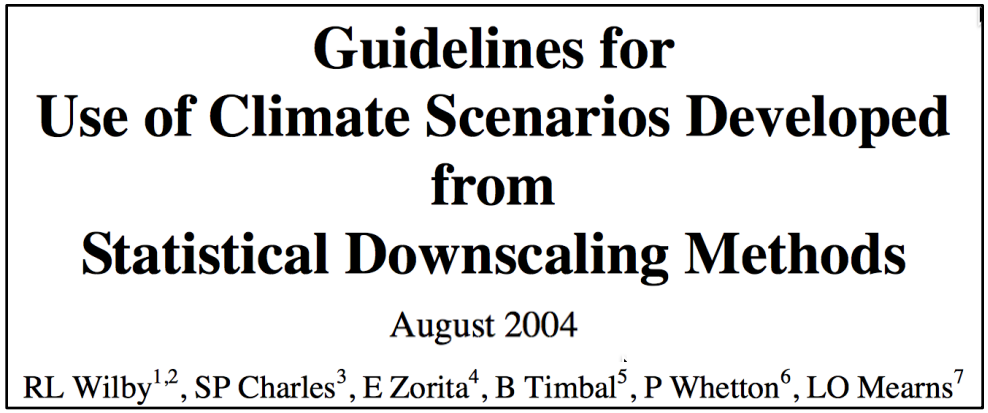
Instance of:
ds:MultiDecadalSimulation

Relationships:

ds:hadModellingCenter
from ICHEC
ds:hadProject from CORDEX
ds:hadDatasetSubset
from DatasetSubset
ds:hadDataProvider
from UDG
ds:hadSimulationModel
from RCA4



4. Guidance and supporting material



Guidelines for
Use of Climate Scenarios Developed from
Statistical Downscaling Methods

August 2004

RL Wilby[1,2], SP Charles[3], E Zorita[4], B Timbal[5], P Whetton[6], LO Mearns[7]

- ❑ Guidance + products to guide/support good practises for e.g.
  - model selection
  - bias correction
  - Statistical downscalig

  WG1 CHs (global, extremes, regional) **+ WG2 (sectoral expertise)**

- ❑ Stimulate research on certain topics (e.g. distillation).