

Bridging the gap between climate information and impact/adaptation application

Timothy Carter
Finnish Environment Institute, SYKE
Research Programme for Global Change

Some key motivations of users in requesting climate information

- § Obtaining general information about climate change – major messages at various scales
- § Obtaining information tailored to user requirements and adaptation decision-making
- § Communicating uncertainties in future projections
- § Ensuring comparability across assessments for co-ordinating integrated responses
- § Reconciling projections with recent trends and with planning/policy scenarios

What has science been able to deliver?

- § Large numbers of new climate projections using cutting edge models
- § Improved databases of climate observations and projections
- § New approaches for downscaling projections from global models
- § Preliminary attempts at representing uncertainties within a probabilistic framework
- § Scientific assessments and some synthesis of the above developments (e.g. by IPCC)

What is still needed

- § **Continued scientific analysis at all scales**
- § **Derived, low volume information and tools for delivering the latest science to non-specialists**
- § **Contextual information for framing uncertainties**
- § **Guidance for users on applying scientific knowledge within a consistent framework**
- § **Regionalisation of the delivery of new information**
- § **Evaluation of data and scenario delivery systems – robustness, effectiveness, uptake, guidance**
- § **Evaluation of interpolated observational datasets**

Some interesting recent developments

- § **Uptake of new high resolution gridded observational climate datasets**
- § **National-level "official" climate scenarios and data/scenario delivery systems/portals**
- § **Stakeholder consultation and user feedback**
- § **Provision of probabilistic climate projections**

High resolution gridded surface land-based observed climate data

- 1. Title: [Representing twentieth-century space-time climate variability. Part II: Development of 1901-96 monthly grids of terrestrial surface climate](#)
Author(s): New M, Hulme M, Jones P
Source: **JOURNAL OF CLIMATE** Volume: 13 Issue: 13 Pages: 2217-2238 Published: JUL 1 2000
Times Cited: 669
[→Links](#)

- 2. Title: [Representing twentieth-century space-time climate variability. Part I: Development of a 1961-90 mean monthly terrestrial climatology](#)
Author(s): New M, Hulme M, Jones P
Source: **JOURNAL OF CLIMATE** Volume: 12 Issue: 3 Pages: 829-856 Published: MAR 1999
Times Cited: 574
[→Links](#)

- 3. Title: [Surface air temperature and its changes over the past 150 years](#)
Author(s): Jones PD, New M, Parker DE, et al.
Source: **REVIEWS OF GEOPHYSICS** Volume: 37 Issue: 2 Pages: 173-199 Published: MAY 1999
Times Cited: 472
[→Links](#)

- 4. Title: [A high-resolution data set of surface climate over global land areas](#)
Author(s): New M, Lister D, Hulme M, et al.
Source: **CLIMATE RESEARCH** Volume: 21 Issue: 1 Pages: 1-25 Published: MAY 23 2002
Times Cited: 216
[→Links](#)

- 1. Title: [An improved method of constructing a database of monthly climate observations and associated high-resolution grids](#)
Author(s): Mitchell TD, Jones PD
Source: **INTERNATIONAL JOURNAL OF CLIMATOLOGY** Volume: 25 Issue: 6 Pages: 693-712 Published: MAY 2005
Times Cited: 248
[→Links](#)

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http://www.worldclim.org/methods.htm

Intranet MOT Intranet worldclim_IJC.pdf (application/pdf Object) WorldClim_Methods

WORLDCLIM

Methods

For a complete description, see: Hijmans, R.J., S.E. Cameron, J.L. Parra, P.G. Jones and A. Jarvis, 2005. Very high resolution interpolated climate surfaces for global land areas. International Journal of Climatology 25: 1965-1978. ([pdf](#))

The data layers were generated through interpolation of average monthly climate data from weather stations (see [methods](#)) on a 30 arc-second resolution grid (often referred to as "1 km²" resolution). Variables included are monthly total precipitation, and monthly mean, minimum and maximum temperature, and 19 derived bioclimatic variables.

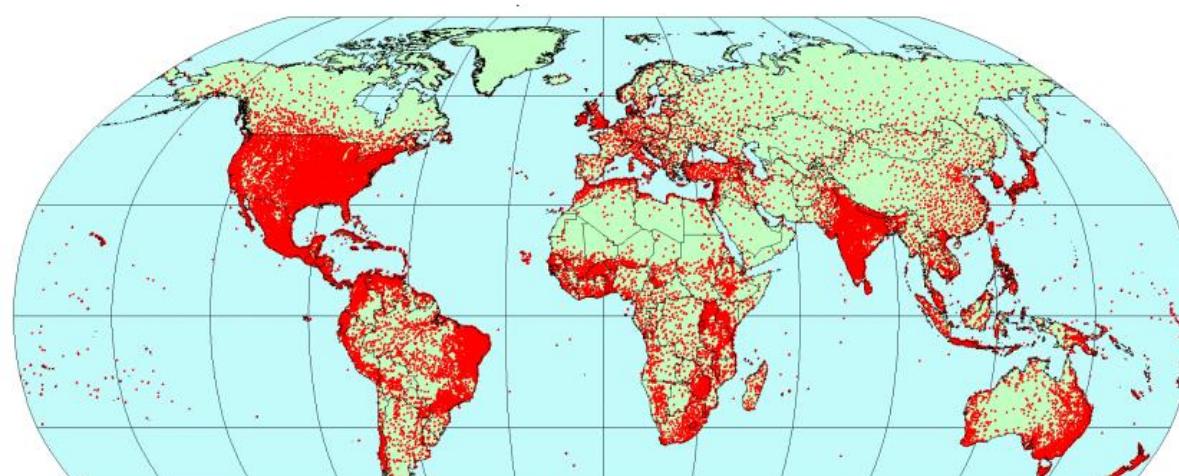
The WorldClim interpolated climate layers were made using:

- Major climate databases compiled by the Global Historical Climatology Network ([GHCN](#)), the [FAO](#), the [WMO](#), the International Center for Tropical Agriculture ([CIAT](#)), [R-HYdroNet](#), and a number of additional minor databases for Australia, New Zealand, the Nordic European Countries, Ecuador, Peru, Bolivia, among others.
- The [SRTM](#) elevation database (aggregated to 30 arc-seconds, "1 km")
- The [ANUSPLIN](#) software. ANUSPLIN is a program for interpolating noisy multi-variate data using thin plate smoothing splines. We used latitude, longitude, and elevation as independent variables.

For stations for which we had records for multiple years, we calculated averages for the 1960-90 period. We only used records for which there were at least 10 years of data. In some cases we extended the time period to the 1950-2000 period to include records from areas for which we had few recent records available (e.g., DR Congo) or predominantly recent records (e.g., Amazonia). We started with the data provided by GHCN, because of the high quality of that database. We then added additional stations from other database. Many of these additional databases had mean monthly values, without a specification of the time period. We added these records anyway, to obtain the best possible spatial representation, reasoning that in most cases these records will represent the 1950-2000 time period, and that insufficient capture of spatial variation is likely to be a larger source of error than in high resolution surfaces than than effects climatic change during the past 50 years. After removing stations with errors, our database consisted of precipitation records from 47,554 locations, mean temperature from 24,542 locations, and minimum and maximum temperature for 14,835 locations (see maps below).

A set of [Bioclimatic variables](#) were derived from the monthly data.

The maps below show the spatial distribution the climate stations for which we had data.



Title: [Very high resolution interpolated climate surfaces for global land areas](#)

Author(s): Hijmans RJ, Cameron SE, Parra JL, et al.

Source: INTERNATIONAL JOURNAL OF CLIMATOLOGY Volume: 25 Issue:
15 Pages: 1965-1978 Published: DEC 2005

Times Cited: [188](#)

ieps.isiknowledge.com/summary.do?product=WOS&search_mode=CitingArticles&qid=6&SID=T17akmPe@629jJcl6M&page=1&action=sort&sortBy=Date&showFirstPa

Go



- 30. Title: [Giants invading the tropics: the oriental vessel fern, Angiopteris evecta \(Marattiaceae\)](#)
Author(s): Christenhusz M J M, Toivonen TK
Source: **BIOLOGICAL INVASIONS** Volume: 10 Issue: 8 Pages: 1215-1228 Published: DEC 2008
Times Cited: 0
[→Links](#)
- 31. Title: [Modelling the partially unknown distribution of wall lizards \(Podarcis\) in North Africa: ecological affinities, potential areas of occurrence, and methodological constraints](#)
Author(s): Kaliontzopoulou A, Brito JC, Carretero MA, et al.
Source: **CANADIAN JOURNAL OF ZOOLOGY-REVUE CANADIENNE DE ZOOLOGIE** Volume: 86 Issue: 9 Pages: 992-1001 Published: SEP 2008
Times Cited: 0
[→Links](#)
- 32. Title: [Temperature as a key driver of ecological sorting among invasive pest species in the tropical Andes](#)
Author(s): Dangles O, Carpio C, Barragan AR, et al.
Source: **ECOLOGICAL APPLICATIONS** Volume: 18 Issue: 7 Pages: 1795-1809 Published: OCT 2008
Times Cited: 0
[→Links](#)
- 33. Title: [Phylogenetic analysis of the endemic New Caledonian cockroach Lauroesilpha. Testing competing hypotheses of diversification](#)
Author(s): Murienne J, Pellens R, Budinoff RB, et al.
Source: **CLADISTICS** Volume: 24 Issue: 5 Pages: 802-812 Published: OCT 2008
Times Cited: 0
[→Links](#)
- 34. Title: [Spatial prediction of Plasmodium falciparum prevalence in Somalia](#)
Author(s): Noor AM, Clements ACA, Gething PW, et al.
Source: **MALARIA JOURNAL** Volume: 7 Article Number: 159 Published: AUG 21 2008
Times Cited: 0
[→Links](#) [Full Text](#)

35. Title: Variability in 20th century climate change reconstructions and its consequences for predicting geographic responses of California mammals!
Author(s): Parra JL, Monahan WB
Source: **GLOBAL CHANGE BIOLOGY** Volume: 14 Issue: 10 Pages: 2215-2231 Published: OCT 2008
Times Cited: 0
[→Links](#)
36. Title: Changes of reanalysis-derived Northern Hemisphere summer warm extreme indices during 1948-2006 and links with climate variability
Author(s): Fang XQ, Wang AY, Fong SK, et al.
Source: **GLOBAL AND PLANETARY CHANGE** Volume: 63 Issue: 1 Pages: 67-78 Published: AUG 2008
Times Cited: 0
[→Links](#)
37. Title: Is UK biofuel supply from Miscanthus water-limited?
Author(s): Richter GM, Riche AB, Dailey AG, et al.
Source: **SOIL USE AND MANAGEMENT** Volume: 24 Issue: 3 Pages: 235-245 Published: SEP 2008
Times Cited: 0
[→Links](#)
38. Title: Step-less models for regional environmental variation in Norway
Author(s): Bakkestuen V, Erikstad L, Halvorsen R
Source: **JOURNAL OF BIOGEOGRAPHY** Volume: 35 Issue: 10 Pages: 1906-1922 Published: OCT 2008
Times Cited: 0
[→Links](#)
39. Title: New evidence for a postglacial homoploid hybrid origin of the widespread Central European *Scabiosa columbaria* L. s. str. (Dipsacaceae)
Author(s): von Hagen KB, Seidler G, Welk E
Source: **PLANT SYSTEMATICS AND EVOLUTION** Volume: 274 Issue: 3-4 Pages: 179-191 Published: SEP 2008

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http://www.worldclim.org/current.htm

Intranet MOT Intranet worldclim_IJC.pdf (application/pdf Object) WORLDCLIM - Current climate

WORLDCLIM

Data download

Choose the [generic](#) or the [ESRI](#) format

Current conditions (~1950-2000)

Generic grids

These grids can be imported into most GIS applications

30 arc-seconds (~1 km) [download by tile](#)

[Min. Temperature](#) [Max. Temperature](#) [Precipitation](#) [Bioclim 1-9](#) [10-18](#) [Altitude](#)

2.5 arc-minutes

[Min. Temperature](#) [Max. Temperature](#) [Precipitation](#) [Bioclim](#) [Altitude](#)

5 arc-minutes

[Min. Temperature](#) [Max. Temperature](#) [Precipitation](#) [Bioclim](#) [Altitude](#)

10 arc-minutes

[Min. Temperature](#) [Max. Temperature](#) [Precipitation](#) [Bioclim](#) [Altitude](#)

ESRI grids

These grids can be used in ArcMap and ArcInfo (with the GRID module) and ArcView (with the Spatial Analyst extension).

30 arc-seconds (~1 km)

[Min. Temperature](#) [Max. Temperature](#) [Precipitation](#) [Bioclim](#) [Altitude](#)

2.5 arc-minutes

[Min. Temperature](#) [Max. Temperature](#) [Precipitation](#) [Bioclim](#) [Altitude](#)

5 arc-minutes

[Min. Temperature](#) [Max. Temperature](#) [Precipitation](#) [Bioclim](#) [Altitude](#)

10 arc-minutes

[Min. Temperature](#) [Max. Temperature](#) [Precipitation](#) [Bioclim](#) [Altitude](#)

Future conditions

Coming soon...

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http://www.worldclim.org/futdown.htm

Intranet MOT Intranet worldclim_IJC.pdf (application/pdf Object) WORLDCLIM - Future climate grids

WORLDCLIM

Future climate data download

IPPC 3rd Assessment data. Future climate projections, calibrated and statistically downscaled using the WorldClim data for 'current' conditions.

Download projected future climate by climate **model** (e.g. CCCMA), emission scenario (e.g. **a2a**), year (e.g. **2050**) and spatial resolution (e.g. 10 arc-minutes). More [info](#). All data are in generic grid format [format](#)

CCCMA

a2a

30 arc-seconds (~1 km)

2020: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18
2050: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18
2080: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18

2.5 arc-minutes

2020: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18
2050: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18
2080: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18

5 arc-minutes

2020: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18
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b2a

30 arc-seconds (~1 km)

2020: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18
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2080: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18

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10 arc-minutes

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2080: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18

HADCM3

a2a

30 arc-seconds (~1 km)

2020: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18
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2080: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18

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5 arc-minutes

2020: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18
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2080: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18

b2a

30 arc-seconds (~1 km)

2020: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18
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5 arc-minutes

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2080: [tmin](#) [tmax](#) [prec](#) bio 1-9 10-18

Examples of international climate data and scenario web portals

Welcome to the IPCC Data Distribution Centre - Mozilla Firefox

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INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
The IPCC Data Distribution Centre

WMO UNEP

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Latest News

Observed Climate Change Impacts A database of observed impacts from AR4 (02/02/2009)

DDC brochure A summary of DDC services (18/09/2008)

Welcome to the IPCC Data Distribution Centre

Location: DDC Home

Welcome to the Data Distribution Centre (DDC) of the Intergovernmental Panel on Climate Change (IPCC). The DDC provides climate, socio-economic and environmental data, both from the past and also in scenarios projected into the future. Technical guidelines on the selection and use of different types of data and scenarios in research and assessment are also provided.

The DDC is designed primarily for climate change researchers, but materials contained on the site may also be of interest to educators, governmental and non-governmental organisations, and the general public.

The identification, selection, and application of baseline and scenario data are crucial steps in the assessments of the potential impacts of future climate change. The need to provide a consistent collection of data covering a great diversity of different scenario elements can pose substantial challenges to researchers. The IPCC DDC seeks to provide access to such a collection of data and scenarios and to offer guidance on their application.

The DDC is overseen by the IPCC Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA) and jointly managed by the British Atmospheric Data Centre (BADC) in the United Kingdom, the CSU World Data Center Climate (WDCC) in Germany, and the Center for International Earth Science Information Network (CIESIN) at Columbia University, New York, USA. The data are provided by co-operating modelling and analysis centres.

Feedback from users is welcome and can be made by completing the feedback form.

Location: DDC Home

A (Excellent) B C D E (Very poor) Rate this page Further feedback Page last modified: 05 February 2009

DKRZ WDC CLIMATE British Atmospheric Data Centre NATIONAL CENTRE FOR ATMOSPHERIC SCIENCE NATURAL ENVIRONMENT RESEARCH COUNCIL defra CIESIN Columbia University NASA

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RT3 Home

Project Home | RT3 Home | Meetings | Documents | Members' Site | Participants | Links to other projects | Research Theme (RT) webpages: RT1 | RT2A | RT2B | RT3 | RT4 | RT5 | RT6 | RT7 | RT8 previous page



Public part

RT2B: Transient experiments 1951-2050 or 1951-2100 driven by global experiments according to [this plan](#)

Institute/ Contact	Scenario	Driving GCM	Model	Resolution	Acronym	DODS/OpenDAP access	Direct download
C4I Ray McGrath	A2	ECHAM5	RCA3	25km	C4IRCA3	Online	Online
CNRM Michel Déqué	A1B	ARPEGE	Aladin	25km	CNRM-RM4.5	Online	Online
KNMI Erik van Meijgaard	A1B	ECHAM5	RACMO	25km	KNMI-RACMO2	Online	Online
OURANOS Dominique Paquin	A1B	CGCM3	CRCM	25km	OURANOSMRCC4.2.1	Online	Online
SMHI Markku Rummukainen	A1B	ECHAM5	RCA	50km	SMHIRCA	Online	Online
SMHI Markku Rummukainen	A1B	BCM	RCA	25km	SMHIRCA	Online	Online
MPI Daniela Jacob	A1B	ECHAM5	REMO	25km	MPI-M-REMO	Online	Online
METNO Jan Erik Haugen	A1B	BCM	HIRHAM	25km	METNOHIRHAM	Online	Online
C4I Ray McGrath	A1B	HadCM3-e1	RCA3	25km	C4IRCA3	Online	Online
UCLM Manuel de Castro	A1B	HadCM3-e1	PROMES	25km	UCLM-PROMES	Online	Online
ETHZ Christoph Schär	A1B	HadCM3Q0	CLM	25km	ETHZ-CLM	Online	Online
	A1B	HadCM3Q0	HadRM3Q0	25km	METO-HC HadRM3Q0	Online	Online
	A1B	HadCM3Q3	HadRM3Q3 (low sensitivity)	25km	METO-HC HadRM3Q3	Some fields online	Some fields online

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http://www.ensembles-eu.org/

Applied Meteorology Group
(UC & CSIC & AEMet)
Santander, Spain

UC UNIVERSIDAD DE CANTABRIA ENSEMBLES

Home Registration Data access Downscaling

4th ENSEMBLES GA presentation
(13/11/2007)

Web portals for Climate Data Access and Statistical Downscaling

One of the ENSEMBLES project's aims is maximizing the exploitation of the results by linking the outputs of the ensemble prediction system to a range of applications, including agriculture, health, food security, energy, water resources, and insurance, which use high resolution climate inputs to feed their models. The **data access portal** allows end-users to interpolate seasonal and climate model simulations to local points of interest, obtaining the requested data in simple formats (e.g., text files). Moreover, the **statistical downscaling portal** allows to calibrate/adapt the coarse model outputs in the region of interest using historical observed records.

The Data Access portal provides access to observations, reanalysis and seasonal and climate simulations (see the common [list of variables](#) available for all models in the portal).

This Statistical Downscaling portal provides user-friendly web access to different statistical downscaling techniques.

Three steps are necessary to obtain high resolution forecasts in a region of interest: 1. Selecting the predictors, 2. Selecting the stations and variable, 3. Running the desired downscaling jobs.

Web portal for statistical downscaling
Applied Meteorology Group
(UC & University of Cantabria)

Zone name: JRC_1.0

Predictors Predictand DOWNSCALE

Data bases: JRC Data details

Variable: mean daily rainfall (mm)

Predictors Predictand DOWNSCALE

Project: DEMETER Data Base: JRC

Legend: January February March April May June July August September October November December

Lead month:	1	2	3	4	5	6	7	8	9	10	11	12
scnr	<input type="checkbox"/>											
scrf	<input type="checkbox"/>											
ulmo	<input type="checkbox"/>											
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scrf	<input type="checkbox"/>											
ulmo	<input type="checkbox"/>											
1958	<input type="checkbox"/>											
1959	<input type="checkbox"/>											

References:

- San-Martín, D., Cofino, A.S., Herrera, S., and Gutiérrez, J.M. (2008) The ENSEMBLES Statistical Downscaling Portal. An End-to-End Tool for Regional Impact Studies. Submitted to *Environmental Modelling and Software*.
- Cofino, A.S., San-Martín, and Gutiérrez, J.M. (2007) A web portal for regional projection of weather forecast using GRID middleware. *Lecture Notes in Computer Science*, 4489, 82-89.

Examples of national climate data and scenario web portals

http://www.anpassung.net/cln_117/nid_701100/DE/Klimaszenarien/Einfuehrung/einfuehrung_node.html?__nnn=true

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Umwelt Bundes Amt KomPass
Für Mensch und Umwelt Kompetenzzentrum Klimafolgen u. Anpassung

KomPass
Kompetenzzentrum Klimafolgen und Anpassung

FACHINFORMATIONEN KLIMASZENARIEN NETZWERK AKTUELLES PROJEKTAKTALOG

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Daten

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Klimaszenarien

Startseite > Klimaszenarien > Einführung

Was sind Klimaszenarien?
Klimaszenarien für Einsteiger
Regionale Klimaszenarien am Umweltbundesamt

Was sind Klimaszenarien?

Zur Bewertung künftiger möglicher Klimaentwicklungen benutzen Wissenschaft und Politik Klimamodelle. Die Ergebnisse der Modelle stellen mögliche Entwicklungskorridore des künftigen Klimas dar und werden Klimaszenarien genannt. Sie bilden eine wichtige Grundlage für die Bewertung der Risiken und Chancen künftiger Klimaänderungen sowie notwendiger Anpassungsmaßnahmen in verschiedenen Sektoren.

Klimaänderungsszenarien entwerfen mögliche, plausible Klimaentwicklungen der Zukunft. Sie sind jedoch nicht als exakte Vorhersagen oder gar als Wetterprognosen zu verstehen!

Grundlage für die Klimamodelle bilden Annahmen über die zukünftige Entwicklung der Emissionen. Die sogenannten Emissionsszenarien beschreiben mögliche künftige demographischen, gesellschaftlichen, wirtschaftlichen und technischen Entwicklungspfade. Vielen Klimaszenarien - auch die des UBA - verwenden die SRES-Emissionsszenarien des IPCC. Es gibt globale Klimamodelle, die das Klima der gesamten Erdoberfläche simulieren und regionale Klimamodelle, die Berechnungen für bestimmte Gebiete liefern. Globale Klimamodelle können gegenwärtig Daten in einer horizontalen Auflösung von etwa 200 x 200 km zur Verfügung stellen. Da diese, für globale Modelle bereits sehr hohe Auflösung für viele Zwecke jedoch nicht ausreicht, wurden Regionalisierungsverfahren entwickelt. Grundsätzlich gibt es dabei zwei verschiedenen Methoden: dynamische und statistische Verfahren. Beispiele dafür sind die vom UBA genutzten Modelle REMO und WETTREG: REMO ist ein dynamisches und WETTREG ein statistisches Verfahren.

[nach oben](#)

Klimaszenarien für Einsteiger

Das Bundesumweltministerium bietet spezielle Arbeitshilfen und Materialien zum Themenfeld "Klimaschutz und Klimapolitik" an. Diese Materialien richten sich besonders an Schüler und Lehrer und behandeln unter anderem die Entstehung von Klimaszenarien und die Folgen des Klimawandels.
Einen guten Einstieg in die Funktionsweise von Klimamodellen liefert der Hamburger Bildungsserver. Unter dem Stichwort "Der Klimawandel und seine Folgen" stehen Arbeitshilfen, Themen und Materialien zur Verfügung.
Das Projekt ClimatePredictionNet ermöglicht jedem Teilnehmer ein vereinfachtes globales Klimamodell auf dem eigenen Heim-, Schul- oder Arbeitscomputer laufen zu lassen. Die Ergebnisse werden gesammelt und im "weltweit größten Experiment zur Klimavorhersage"

Aktuelles

Strategien der Anpassung: Broschüre und Themenblätter des UBA
Fünfter Newsletter mit einem Schwerpunkt zu Bevölkerungsschutz einschließlich Katastrophenschutz veröffentlicht
Erstellung regionaler Klimaszenarien für Deutschland
mehr

Termine

11.07.2008 - 19.04.2009 2° - Das Wetter, der Mensch und sein Klima
10.02.2009 - 11.02.2009 Kulturlandschaften im globalen Klimawandel
16.02.2009 - 18.02.2009 Zwischenstaatliches Expertentreffen Maritime Transport and the Climate Change Challenge
19.02.2009 - 21.02.2009 4. ExtremWetterKongress 2009
02.03.2009 - 04.03.2009 Konferenz anlässlich der 600-Jahr-Feiern der Universität Leipzig:

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http://www.anpassung.net/nn_700712/DE/Klimaszenarien/Daten/daten_node.html?__nnn=true

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KLIMASZENARIEN

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- Karten
- Daten

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- Newsletter
- Extranet

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Daten

Verfügbarkeit der Klimaszenariendaten

Das Umweltbundesamt möchte die Forschung im Bereich der Klimawirkung aktiv unterstützen. Daher stellt das Kompetenzzentrum Klimafolgen und Anpassung auch die Rohdaten der Modellläufe interessierten Anwendern zur Verfügung. Die Datensätze können nach Registrierung kostenfrei verwendet werden.

Die Klimaszenarien stehen in der [Klimadatenbank \(CERA\)](#) des [World Data Center for Climate \(WDCC\)](#) zur Verfügung. Informationen über die zur Verfügung stehenden Daten (Metadaten) sind frei abrufbar. So können Sie einen ersten Eindruck zu Struktur und Umfang der Klimaszenariendaten gewinnen. Die Daten selber sind ebenfalls frei verfügbar und werden nach Registrierung und Unterzeichnung einer Nutzervereinbarung zugängig gemacht (siehe unten).

Wir weisen darauf hin, dass die CERA-Datenbank den Modelloutput in Form von ASCII-Daten bzw. im Format netCDF enthält. Die Daten liegen in der Datenbank nicht in Form regionaler Muster (Karten) oder als Darstellung zeitlicher Verläufe von Klimaparametern vor.

Tabelle 1: Nutzerinformationen zu den Modellen REMO und WETTREG

	REMO	WETTREG
CERA-Kennung	REMO-UBA	WETTREG-UBA
WWW-Gateway	Einstieg REMO-UBA	Einstieg WETTREG-UBA
Daten-Format	netCDF und ASCII – Code	ASCII – Code
Datenmenge (Beispiel)	rund 138 Gigabyte pro Parameter (alle 3 Szenarien, alle Dekaden)	rund 65 Gigabyte (pro Szenario für alle Dekaden)
Hinweise für Datennutzer	Informationen des MPI Hinweise [PDF] Hinweise Teil 2 [PDF]	Webseite CEC
Beratung	remo-daten[at]dkrz.de	wettreg-daten[at]dkrz.de
Nutzungsbedingungen	REMO deutsch [PDF] REMO englisch [PDF]	WETTREG deutsch [PDF] WETTREG englisch [PDF]

Nutzungsbedingungen

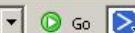
Voraussetzung für die kostenfreie Nutzung ist die Unterzeichnung der Nutzungsbedingungen. Die Kernaussage der Vereinbarung: Das Umweltbundesamt erlaubt die kostenfreie Nutzung der Klimaszenariendaten im Rahmen klar definierter Verwendungszwecke. Im Gegenzug verpflichtete sich der Nutzer, die Ergebnisse seiner Arbeit (Publikationen, Abschlussberichte etc.) dem Umweltbundesamt bekannt zu geben.

Aktuelles

- Strategien der Anpassung: Broschüre und Themenblätter des UBA
- Fünfter Newsletter mit einem Schwerpunkt zu Bevölkerungsschutz einschließlich Katastrophenschutz veröffentlicht
- Erstellung regionaler Klimaszenarien für Deutschland
- mehr

Termine

- 11.07.2008 - 19.04.2009 2° - Das Wetter, der Mensch und sein Klima
- 10.02.2009 - 11.02.2009 Kulturlandschaften im globalen Klimawandel
- 16.02.2009 - 18.02.2009 Zwischenstaatliches Expertentreffen Maritime Transport and the Climate Change Challenge
- 19.02.2009 - 21.02.2009 4. ExtremWetterKongress 2009
- 02.03.2009 - 04.03.2009 Konferenz anlässlich der 600-Jahr-Feiern der Universität Leipzig: RISIKO ERDE? - Vulnerabilität, Naturgefahren, integrierte Anpassungsstrategien
- 18.03.2009 - 19.03.2009



Start page

Snow Weather Water Climate

Go to maps



Short cut to maps

Most popular themes:

Precipitation

Analyses

[Weekly report snow](#)

[Weekly report water](#)

[reservoir levels](#)

[Weekly report energy situation](#)

[Hydrology monthly report](#)

[Climate monthly report](#)

[Hydrology annual report](#)

[Glaciological investigations](#)

Warnings

[Flood and draught](#)

[Weather forecast short term](#)

[Weather forecast seasonal](#)

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[Ice conditions](#)

Welcome to seNorge.no!

Snow, weather, water and climate in Norway

seNorge.no – snow, weather, water and climate maps for Norway updated daily. Data are given as daily, monthly and annual values, as well as for climate periods and scenarios. There are daily maps back to the 1960s and up to tomorrow. Dozens of themes are presented as several hundred thousand maps. Show time series from the NVE and met.no databases. These are useful for hazard mitigation for flood, drought, energy supply shortages, avalanches and landslides and climate change, as well as for businesses and outdoor enthusiasts.

Snow



Snow maps for Norway. Find maps of snow quantity, fresh snow, skiing conditions, snow melt, snow depths and change in snow quantity.

Weather



Weather maps for Norway. Maps of daily, monthly and annual values of precipitation, air temperature and deviation from normal.

Water



Water maps for Norway. Find daily, weekly, monthly and annual maps of rain and snow melt.

Climate



Maps of climate, climate scenarios and climate effect for Norway. Find selected normal and scenarios for precipitation, temperature, snow, runoff, soil moisture and ground water.

Messages

Two new snow themes now available: "Snow water equivalent" and "Days since last snow fall". (07.03.2008)

Added value! View the location of our (NVE and met.no) observations on the maps and present data from our databases as graphs or in tables. (21.09.2007)

Maps are updated daily at 7 a.m. (forecast maps) and 10 a.m. (observation maps). Maps for the previous 14 days are updated every Tuesday afternoon. (27.04.2007)

An English version of this web site is now available. The web site has been upgraded and 23 new scenarios of climate and climate effects have been added. (19.12.2006)

Developed by

[Norwegian Water and Energy Directorate \(NVE\)](#)

[Norwegian Meteorological Institute \(met.no\)](#)

[Norwegian Mapping Authorities](#)

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The service www.seNorge.no was developed by



Norwegian
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NORWEGIAN MAPPING
AUTHORITY

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[Start page](#) : Map page

Snow Weather Water Climate

Location search Show/hide

Theme list

Select theme:

- Precipitation
 - Normal 1961-1990
 - Normal 1971-2000
 - % change to 2071-2100
- Temperature
- Evaporation
- Snow amounts
- Snow depths
- Snow wetness
- Snow duration
- Soil moisture
- Ground water
- Runoff

Reference layers

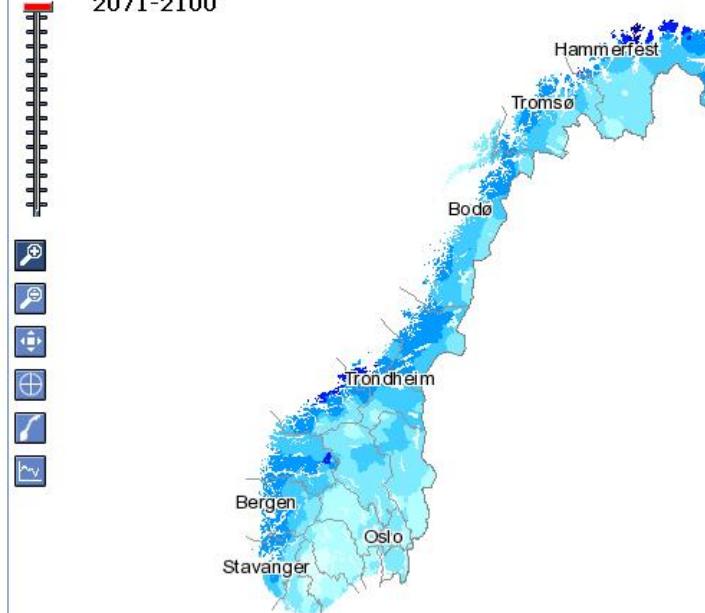
Select extra layers on map:

- Stations
 - met.no stations
 - NVE stations
- Basic layers
 - Basic
 - Contours
 - Hydropower
 - Catchments
 - Topography
 - Imagery

Help

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- [Navigate in time](#)
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- [Turn basic map on/off](#)
- [Select theme](#)
- [Show graphs and data](#)
- [More tips and FAQ](#)

Percent change in normal annual precipitation from 1961-1990 to 2071-2100



Theme from NVE met.no

Presented on seNorge.no

UTM zone 33 coordinates are 1283114 East and 6668016 North

Map scale 1: 13782097

[Show larger map](#) | [Printer friendly version](#) | [Display link to map](#) | [Feedback](#)

Theme information

Map shows percentage change in normal annual precipitation from normal period 1961-1990 to 2071-2100.

Colour legend

%	Above 30
	25 - 30
	20 - 25
	15 - 20
	10 - 15
	5 - 10
	Below 5

Map legend

Oslo Placename

- National boundary
- County boundary
- Lake





[Start page](#) : [Map page](#)

Snow Weather Water Climate

Location search Show/hide

Theme list

Select theme:

- Precipitation
 - Normal 1961-1990
 - Normal 1971-2000
 - % change to 2071-2100
- Temperature
- Evaporation
- Snow amounts
- Snow depths
- Snow wetness
- Snow duration
- Soil moisture
- Ground water
- Runoff

Reference layers

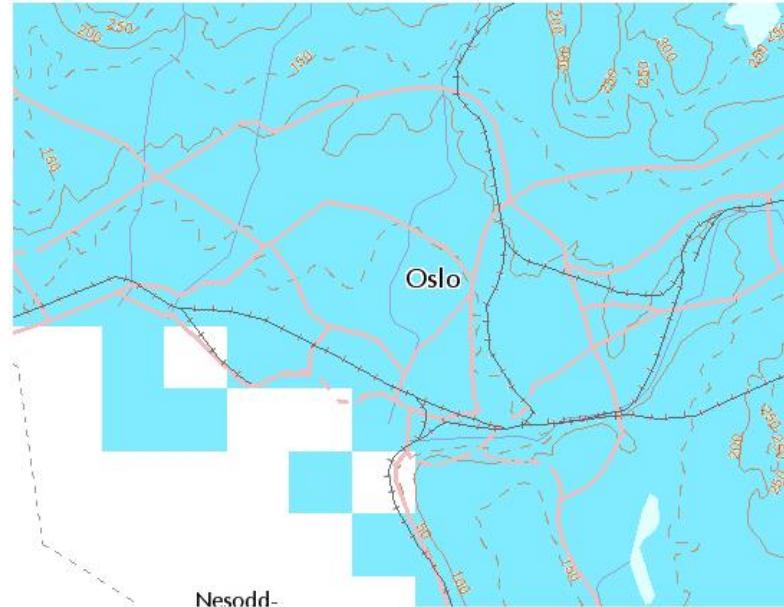
Select extra layers on map:

- Stations
 - met.no stations
 - NVE stations
- Basic layers
 - Basic
 - Contours
 - Hydropower
 - Catchments
 - Topography
 - Imagery

Help

- [Getting started](#)
- [Navigate in time](#)
- [Navigate in maps](#)
- [Turn basic map on/off](#)
- [Select theme](#)
- [Show graphs and data](#)
- [More tips and FAQ](#)

Percent change in normal annual precipitation from 1961-1990 to 2071-2100



Theme from NVE met.no

Presented on seNorge.no

UTM zone 33 coordinates are 261543 East and 6645545 North

Map scale 1: 88215

[Show larger map](#) | [Printer friendly version](#) | [Display link to map](#) | [Feedback](#)

Theme information

Map shows percentage change in normal annual precipitation from normal period 1961-1990 to 2071-2100.

Colour legend

%
Above 30
25 - 30
20 - 25
15 - 20
10 - 15
5 - 10
Below 5

Map legend

Oslo Placename

- National boundary
- County boundary
- Lake
- Lake shoreline
- River
- Glacier contour
- Coastline
- Road
- Railroad





[Start page](#) : Map page

Snow Weather Water Climate

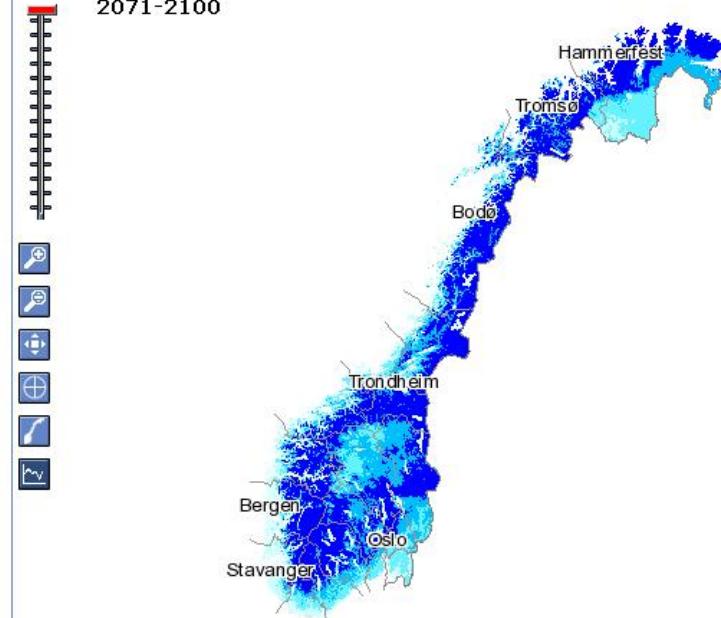
Location search Show/hide

Theme list

Select theme:

- Precipitation
- Temperature
- Evaporation
- Snow amounts
- Snow depths
- Snow wetness
- Snow duration
- Soil moisture
- Ground water
- Runoff
 - [Normal annual](#)
 - [Normal winter](#)
 - [Normal spring](#)
 - [Normal summer](#)
 - [Normal autumn](#)
 - [Change annual](#)
 - [Change winter](#)
 - [Change spring](#)
 - [Change summer](#)
 - [Change autumn](#)
 - [% change annual](#)
 - [% change winter](#)
 - [% change spring](#)
 - [% change summer](#)
 - [% change autumn](#)

Percentage change in mean winter runoff from 1961-1990 to 2071-2100



Theme from NVE

Presented on seNorge.no

UTM zone 33 coordinates are 820862 East and 6517516 North

Map scale 1: 13782097

[Show larger map](#) | [Printer friendly version](#) | [Display link to map](#) | [Feedback](#)

Theme information

Percentage change in mean winter (DJF) runoff from 1961-1990 to 2071-2100 for the RegClim-Echam/B2 scenario.

Colour legend

Percent

Above 100
50 - 100
20 - 50
5 - 20
+5 - 5
+20 - +5
+50 - +20
+75 - +50
Below +75

Map legend

Oslo Placename

- National boundary
- County boundary
- Lake

Reference layers

Select extra layers on map:

- Stations
 - met.no stations
 - NVE stations
- Basic layers
 - Basic
 - Contours
 - Hydropower
 - Catchments
 - Topography
 - Imagery



[Start page](#) : [Map page](#)

Snow Weather Water Climate

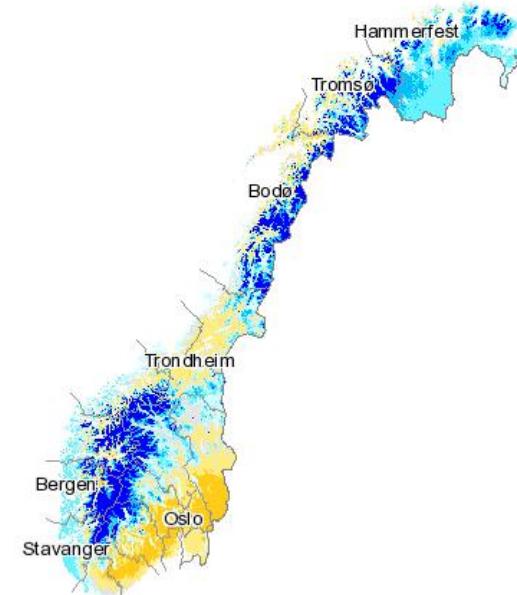
Location search Show/hide

Theme list

Select theme:

- Precipitation
- Temperature
- Evaporation
- Snow amounts
- Snow depths
- Snow wetness
- Snow duration
- Soil moisture
- Ground water
- Runoff
 - [Normal annual](#)
 - [Normal winter](#)
 - [Normal spring](#)
 - [Normal summer](#)
 - [Normal autumn](#)
 - [Change annual](#)
 - [Change winter](#)
 - [Change spring](#)
 - [Change summer](#)
 - [Change autumn](#)
 - [% change annual](#)
 - [% change winter](#)
 - [% change spring](#)
 - [% change summer](#)
 - [% change autumn](#)

Percentage change in mean spring runoff from 1961-1990 to 2071-2100



Theme from NVE

Presented on seNorge.no

UTM zone 33 coordinates are

East and

North

Map scale 1: 13782097

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Theme information

Percentage change in mean spring (MAM) runoff from 1961-1990 to 2071-2100 for the RegClim-Echam/B2 scenario.

Colour legend

Percent

	Above 100
	50 - 100
	20 - 50
	5 - 20
	+5 - 5
	+20 - +5
	+50 - +20
	+75 - +50
	Below -75

Map legend

Oslo Placename

-
-
-

Reference layers

Select extra layers on map:

- Stations
 - met.no stations
 - NVE stations
- Basic layers
 - Basic
 - Contours
 - Hydropower
 - Catchments
 - Topography
 - Imagery



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Snow Weather Water Climate

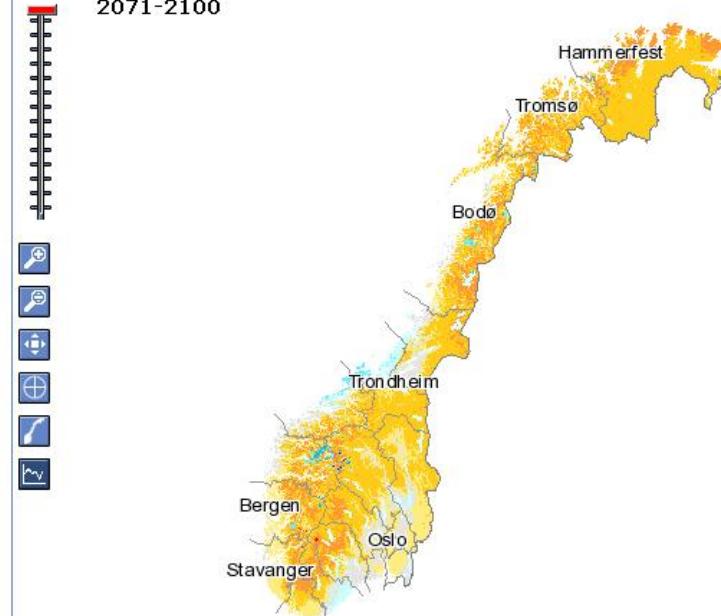
Location search Show/hide

Theme list

Select theme:

- Precipitation
- Temperature
- Evaporation
- Snow amounts
- Snow depths
- Snow wetness
- Snow duration
- Soil moisture
- Ground water
- Runoff
 - [Normal annual](#)
 - [Normal winter](#)
 - [Normal spring](#)
 - [Normal summer](#)
 - [Normal autumn](#)
 - [Change annual](#)
 - [Change winter](#)
 - [Change spring](#)
 - [Change summer](#)
 - [Change autumn](#)
 - [% change annual](#)
 - [% change winter](#)
 - [% change spring](#)
 - [% change summer](#)
 - [% change autumn](#)

Percentage change in mean summer runoff from 1961-1990 to 2071-2100



Theme from NVE

Presented on seNorge.no

UTM zone 33 coordinates are 1480198 East and 6574845 North

Map scale 1: 13782097

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Theme information

Percentage change in mean summer (JJA) runoff from 1961-1990 to 2071-2100 for the RegClim-Echam/B2 scenario.

Colour legend

Percent

	Above 100
	50 - 100
	20 - 50
	5 - 20
	+5 - 5
	+20 - +5
	+50 - +20
	+75 - +50
	Below -75

Map legend

Oslo Placename

-
-
-

Reference layers

Select extra layers on map:

- Stations
 - met.no stations
 - NVE stations
- Basic layers
 - Basic
 - Contours
 - Hydropower
 - Catchments
 - Topography
 - Imagery



[Start page](#) : Map page

Snow Weather Water Climate

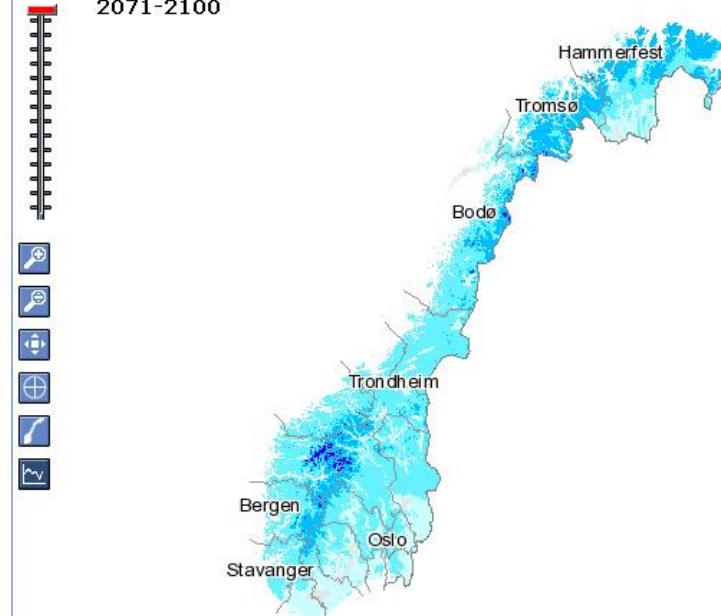
Location search Show/hide

Theme list

Select theme:

- Precipitation
- Temperature
- Evaporation
- Snow amounts
- Snow depths
- Snow wetness
- Snow duration
- Soil moisture
- Ground water
- Runoff
 - [Normal annual](#)
 - [Normal winter](#)
 - [Normal spring](#)
 - [Normal summer](#)
 - [Normal autumn](#)
 - [Change annual](#)
 - [Change winter](#)
 - [Change spring](#)
 - [Change summer](#)
 - [Change autumn](#)
 - [% change annual](#)
 - [% change winter](#)
 - [% change spring](#)
 - [% change summer](#)
 - [% change autumn](#)

Percentage change in mean autumn runoff from 1961-1990 to 2071-2100



Theme from NVE

Presented on seNorge.no

UTM zone 33 coordinates are

East and

North

Map scale 1: 13782097

[Show larger map](#) | [Printer friendly version](#) | [Display link to map](#) | [Feedback](#)

Theme information

Percentage change in mean autumn (SON) runoff from 1961-1990 to 2071-2100 for the RegClim-Echam/B2 scenario.

Colour legend

Percent

	Above 100
	50 - 100
	20 - 50
	5 - 20
	+5 - 5
	+20 - +5
	+50 - +20
	+75 - +50
	Below -75

Map legend

Oslo Placename

- National boundary
- County boundary
- Lake

Reference layers

Select extra layers on map:

- Stations
 - met.no stations
 - NVE stations
- Basic layers
 - Basic
 - Contours
 - Hydropower
 - Catchments
 - Topography
 - Imagery



CLIMATE PROGRAM OFFICE

Understanding climate variability and change to enhance society's ability to plan and respond

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Climate Research & Modeling

Climate Service Development

Partnerships

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Special Projects

CCSP Products

International Polar Year

Argos JTA

Regional Integrated Sciences & Assessments

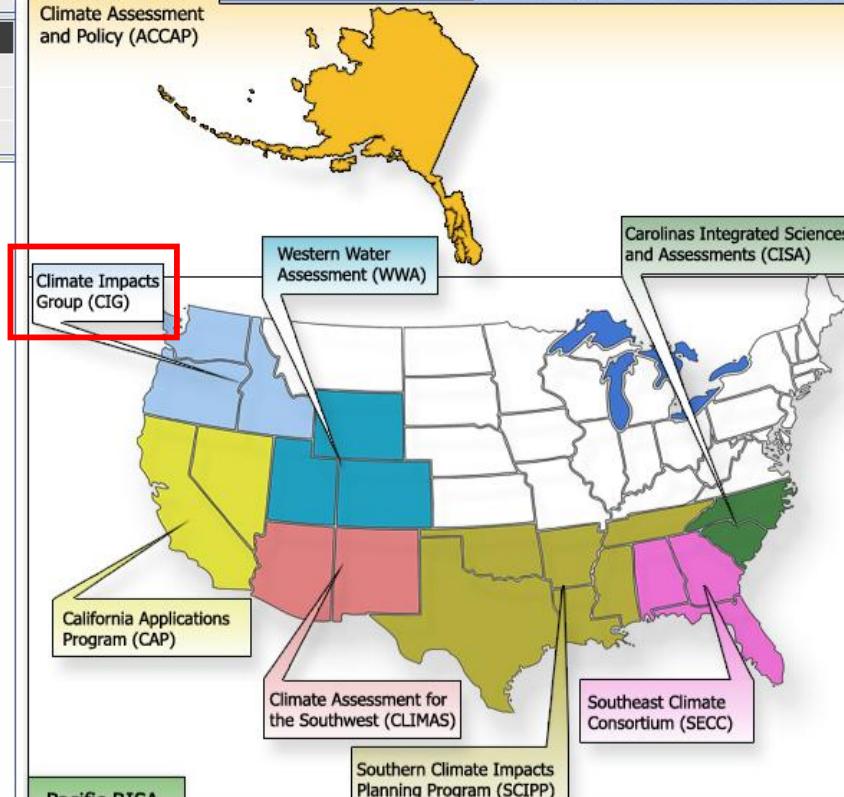
Description Background Funded Projects Meetings / Events Publications Contact Info

Description

The Regional Integrated Sciences and Assessments (RISA) program supports research that addresses complex climate sensitive issues of concern to decision-makers and policy planners at a regional level. The RISA research team members are primarily based at universities though some of the team members are based at government research facilities, non-profit organizations or private sector entities. Traditionally the research has focused on the fisheries, water, wildfire, and agriculture sectors. The program also supports research into climate sensitive public health issues. Recently, coastal restoration has also become an important research focus for some of the teams.

Click on the region below to view the RISA team websites or select from the list below the map.

Currently Funded RISA Teams





Forecasts and Planning Tools

Climate Change Scenarios

On This Page

- Introduction
- Future Northwest Climate
- Comparing the 2008 Scenarios with Previous PNW Scenarios
- Climate Change Streamflow Scenarios
- Planning for Climate Change
- Caveats and Other Comments

Forecasts and Planning Tools

In This Section . . .

- Planning for Climate Variability and Change
- Seasonal to Interannual Forecasts
- **Climate Change Scenarios**
 - ↳ Climate Change Streamflow Scenario Tool
 - ↳ Climate Change Scenarios Archive
- PNW Climate Mapping Tool
- Adaptation Guidebook

Related Pages

- Publications
- Data / Links

Introduction

Although climate can vary naturally and will continue to do so in the future, human inputs of greenhouse gases are almost certain to cause continued warming of the planet. This warming has potentially significant implications for the Pacific Northwest (PNW) that warrant consideration in resource planning and management.

Estimates of future carbon dioxide (CO₂) concentrations range from 549 to 970 parts per million by volume (ppmv) by 2100. This increase is 2 to 3.5 times the pre-industrial (circa 1750) value of 280 ppmv. Numerous research centers around the world have used these projections of future greenhouse gas concentrations in numerical models of Earth's climate system to project future global climate.

The Climate Impacts Group (CIG) recently examined [a select subset](#) of these global simulation models, driven by two greenhouse gas emissions scenarios ([B1 and A1B](#)), and produced updated scenarios of future climate for the PNW. The CIG is also developing a [regional climate model](#) for evaluating regional-scale climate change impacts.

A summary of the new (2008) scenarios is provided below. Annual and seasonal [climate change scenario summary data](#) is also available for download.

Future Northwest Climate

Temperature

As with previous assessments of PNW climate change, all scenarios evaluated by the CIG project a warmer PNW climate in the 21st century. In comparison with 20th century PNW climate:

- **The rate of change will be greater.** Climate models project an average rate of warming of approximately 0.5°F (0.3°C) per decade through the 2050s (range: 0.2–1.0°F, or 0.1–0.6°C, per decade). The rate of change after the 2050s depends increasingly on the choice of greenhouse gas emissions scenarios. For comparison, the observed rate of 20th century PNW warming was approximately 0.2°F (0.1°C) per decade. The observed rate of warming for the second half of the 20th century was approximately 0.4°F (0.2°C) per decade.
- **The total amount of change will be greater.** [Average*](#) annual temperature is projected to increase 2.2°F (1.2°C) by the decade of the 2020s, 3.5°F (2.0°C) by the decade of the 2040s, and 5.9°F (3.3°C) by the decade of the 2080s, relative to 1970–1999 average temperature (see [Table 1](#)). The projected change in average annual temperature is substantially greater than the 1.5°F (0.8°C) increase in average annual temperature observed in the PNW during the 20th century ([Mote 2003](#)).

* All scenarios will be warmer. Temperatures are projected to increase across all

Changes in Annual Mean		
	Temperature	Precipitation
2020s		
Low	+ 1.1°F (0.6°C)	-9%
Average*	+ 2.2°F (1.2°C)	+1%
High	+ 3.4°F (1.9°C)	+12%
2040s		
Low	+ 1.6°F (0.9°C)	-11%
Average*	+ 3.5°F (2.0°C)	+2%
High	+ 5.2°F (2.9°C)	+12%
2080s		
Low	+ 2.8°F (1.6°C)	-10%
Average*	+ 5.9°F (3.3°C)	+4%
High	+ 9.7°F (5.4°C)	+20%

Table 1: Average changes in PNW climate from 20 climate models and two greenhouse gas emissions scenarios (B1 and A1B) for the 2020s, 2040s, and 2080s. All changes are benchmarked to average temperature and precipitation for 1970-1999. * Model values are weighted to produce the "average". Note that the low and high values below are the highest and lowest values for temperature and precipitation from all of the modeled scenarios and do not necessarily come from the same model. ([More summary data](#))

click image to enlarge

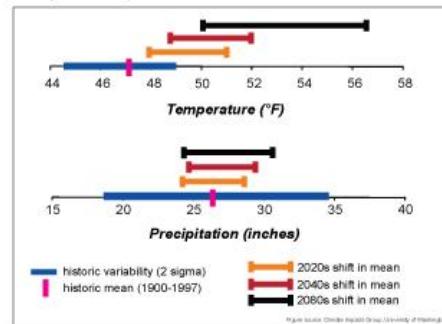


Figure 1 Comparison of observed year-to-year variability and projected shifts in average temperature and precipitation from 20 climate models. The blue bars represent the year-to-year variability in PNW temperature and precipitation during the 20th century. The pink bar represents the historic average for 20th century PNW temperature and precipitation. The orange, maroon, and black lines indicate the projected shift in the historic average for the 2020s, 2040s, and 2080s, respectively. Average temperature could exceed the year-to-year variability observed during the 20th century as early as the 2020s, while future projected precipitation falls within the range of past variability. Source: Climate Impacts Group, University of Washington.

Precipitation

Modest changes in regional precipitation are expected through mid-century, although changes in precipitation are less certain than changes in temperature due to challenges associated with modeling precipitation at the global and regional scale. More specifically:

- The projected change in average annual precipitation for all models combined

For More Information

- Brief technical report on the CIG's 2008 climate change scenarios
- Summary data for the 2008 climate change scenarios (seasonal and annual summaries)
- Overview of global and regional climate change
- PNW climate change impacts

Comparing the 2008 Scenarios with Previous PNW Scenarios

How do the 2008 climate change scenarios differ from the CIG's [previous \(2005\) scenarios](#)? The 2008 PNW climate change scenarios show slightly larger annual temperature increases in all three periods (2020s, 2040s, and 2080s) than the 2005 scenarios ([Table 2](#)). For precipitation, the average annual change is about the same but the range of possible precipitation changes is greater in all of the periods analyzed. In other words, the 2008 model results are both drier (at the low end) and wetter (at the high end) than the 2005 scenarios. These differences are largely due to the following:

- **Consideration of more models and different emissions scenarios.** The CIG's 2005 climate change projections were derived using 10 global climate models forced by the B1 and A2 greenhouse gas and sulfate aerosol emission scenarios ([2005 emissions scenarios and climate models, Mote et al. 2005](#)). The 2008 climate change scenarios are derived from an evaluation of [20 global climate models](#) driven by the B1 and A1B emissions scenarios. The increases in the range for precipitation is primarily related to the switch from the A2 to the A1B emissions scenario.
- **Use of Reliability Ensemble Averaging.** As part of the 2008 climate change scenarios update, the CIG used Reliability Ensemble Averaging ([REA](#)) to evaluate the climate change simulations. REA weights regionally-averaged GCM simulations in accordance with each model's ability to replicate 20th century Pacific Northwest climate.

More detailed information on how the 2008 scenarios may affect PNW resources will become available as the CIG incorporates the new scenarios into future climate impacts assessments.

	Annual Temperature Change		Annual Precipitation Change	
	2005 Scenarios	2008 Scenarios	2005 Scenarios	2008 Scenarios
2020s				
Low	+ 0.7°F (0.4°C)	+ 1.1°F (0.6°C)	- 4%	- 9%
Average	+ 1.9°F (1.1°C)	+ 2.2°F (1.2°C)	+ 2%	+ 1%
High	+ 3.2°F (1.8°C)	+ 3.4°F (1.9°C)	+ 7%	+ 12%
2040s				
Low	+ 1.4°F (0.8°C)	+ 1.6°F (0.9°C)	- 4%	- 11%
Average	+ 2.9°F (1.6°C)	+ 3.6°F (2.0°C)	+ 2%	+ 2%
High	+ 4.6°F (2.6°C)	+ 5.2°F (2.9°C)	+ 9%	+ 12%
2080s				
Low	+ 2.9°F (1.6°C)	+ 2.9°F (1.6°C)	- 2%	- 10%
Average	+ 5.6°F (3.1°C)	+ 5.9°F (3.3°C)	+ 6%	+ 4%
High	+ 8.8°F (4.9°C)	+ 9.7°F (5.4°C)	+ 18%	+ 20%

Table 2: A comparison of the CIG's 2008 climate change projections with the 2005 scenario projections ([more 2008 scenario summary data](#)). Note that the low and high values below are the highest and lowest values for temperature and precipitation from all of the modeled scenarios and do not necessarily come from the same model.

File Edit View Go Bookmarks Tools Help

W http://cses.washington.edu/cig/fpt/08scensumdata.shtml

 Additional Summary Data for 2008 Pacific Northwest Climate Change Scenarios

For more comprehensive data sets, please contact the [CIG](#).

Summary data for the 20th century, 2020s, 2040s, and 2080s are available for download in the following Excel spreadsheets. Seasons are classified as follows: fall = Sept, Oct, Nov; winter = Dec, Jan, Feb; spring = March, April, May; summer = June, July, Aug.

20th Century

- [20th century simulations by season](#) - This set of data and graphs compares seasonal simulations of 20th century PNW temperature and precipitation with observed temperature and precipitation. Simulation results are shown for individual global climate models and the average of all models. This information is helpful for understanding how well individual models simulate past climate and what biases may exist in individual models (e.g., whether a specific model tends to be warmer or cooler than observed conditions).

2020s

- [2020s annual projections](#) - This set of data and graphs shows projected annual change in PNW temperature and precipitation for the decade of the 2020s. Results for each emissions scenario (B1 and A1B) are shown for individual global climate models and the average of all models. Results are also show for the average of the two emissions scenarios.
- [2020s projections by season](#) - Same as above except results are provided at a seasonal (winter, spring, summer fall) time step.

2040s

- [2040s annual projections](#) - This set of data and graphs shows projected annual change in PNW temperature and precipitation for the decade of the 2040s. Results for each emissions scenario (B1 and A1B) are shown for individual global climate models and the average of all models. Results are also show for the average of the two emissions scenarios.
- [2040s projections by season](#) - This set of data and graphs shows projected seasonal changes in 2040s PNW temperature and precipitation for the B1 and A1B scenarios. Results for each emissions scenario are shown for individual global climate models and the average of all models.

2080s

- [2080s annual projections](#) - This set of data and graphs shows projected annual change in PNW temperature and precipitation for the decade of the 2080s. Results for each emissions scenario (B1 and A1B) are shown for individual global climate models and the average of all models. Results are also show for the average of the two emissions scenarios.
- [2080s projections by season](#) - This set of data and graphs shows projected seasonal changes in 2080s PNW temperature and precipitation for the B1 and A1B scenarios. Results for each emissions scenario are shown for individual global climate models and the average of all models.

Consolidated Tables

- [All seasonal summary data](#) (graphs updated August 22, 2008)

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M35

Projected seasonal change for the 2040s

sres B1 CELSIUS 2040s AT FAHRENHEIT 2040s AT in F

Model	B1:DJF	B1:MAM	B1:JJA	B1:SON	B1:DJF	B1:MAM	B1:JJA	B1:SON
BCCR	0.93	0.56	1.28	0.95	1.67	1.01	2.30	1.71
CCSM3	1.93	1.83	2.58	2	3.47	3.29	4.64	3.60
CGCM3.1_t47	1.88	1.32	1.49	1.09	3.38	2.38	2.68	1.96
CGCM3.1_t63	1.77	2.21	1.51	1.48	3.19	3.98	2.72	2.66
CNRM	0.57	0.78	1.88	0.99	1.03	1.40	3.38	1.78
CSIRO3.5	1.38	1.17	1.49	1.4	2.48	2.11	2.68	2.52
ECHAM5	1.42	1.2	1.17	1.18	2.56	2.16	2.11	2.12
ECHO_g	0.9	1.8	2.54	2.22	1.62	3.24	4.57	4.00
FGOALS	2.09	2.03	1.57	0.78	3.76	3.65	2.83	1.40
GFDL2.0	1.13	0.89	2.01	1.66	2.03	1.60	3.62	2.99
GFDL2.1	1.6	1.53	2.02	1.51	2.88	2.75	3.64	2.72
GISS_AOM	1.42	0.95	1.06	1.18	2.56	1.71	1.91	2.12
GISS_er	0.76	0.73	1.77	1.11	1.37	1.31	3.19	2.00
HADCM	0.96	1.13	3.11	2.27	1.73	2.03	5.60	4.09
HADGEM1	na	na	na	na	na	na	na	na
INMCM	1.79	1.12	1.55	1.22	3.22	2.02	2.79	2.20
IPSL	2.1	1.68	2.27	1.66	3.78	3.02	4.09	2.99
MIROC_hi	2.63	2.98	2.65	2.41	4.73	5.36	4.77	4.34
MIROC_3.2	2.22	2.37	2.35	2.07	4.00	4.27	4.23	3.73
PCM1	0.82	0.74	0.85	0.95	1.48	1.33	1.53	1.71
average	1.49	1.42	1.85	1.48	2.68	2.56	3.33	2.66
REA	1.4	1.49	2.08	1.44	2.52	2.68	3.74	2.59
average	1.49	1.42	1.85	1.48	2.68	2.56	3.33	2.66
REA	1.4	1.49	2.08	1.44	2.52	2.68	3.74	2.59
sres A1B	CELSIUS 2040s AT				FAHRENHEIT 2040s AT in F			
Model	A1B: DJF	A1B: MAM	A1B: JJA	A1B: SON	A1B: DJF	A1B: MAM	A1B: JJA	A1B: SON
BCCR	1.15	0.77	1.91	1.38	2.07	1.39	3.44	2.48
CCSM3	1.7	1.98	3.23	2.62	3.06	3.56	5.81	4.72
CGCM3.1_t47	2.07	1.67	2.19	1.41	3.73	3.01	3.94	2.54
CGCM3.1_t63	2.43	2.04	1.96	1.59	4.37	3.67	3.53	2.86
CNRM	0.94	0.75	2.71	1.69	1.69	1.35	4.88	3.04
CSIRO3.5	1.86	1.44	2.06	2.18	3.35	2.59	3.71	3.92
ECHAM5	1.28	1.2	1.81	1.96	2.30	2.16	3.26	3.53
ECHO_g	1.51	1.79	2.39	2.26	2.72	3.22	4.30	4.07
FGOALS	2.38	2.7	2.23	0.75	4.28	4.86	4.01	1.35
GFDL2.0	1.58	1.8	3.09	2.16	2.84	3.24	5.56	3.89
GFDL2.1	1.25	1.31	3.36	2.34	2.25	2.36	6.05	4.21
GISS_AOM	2.15	1.35	1.07	1.36	3.87	2.43	1.93	2.45
GISS_er	1.1	0.95	2.58	1.51	1.98	1.71	4.64	2.72
HADCM	1.29	1.44	4.4	2.78	2.32	2.59	7.92	5.00
HADGEM1	2.12	2.7	3.55	2.87	3.82	4.86	6.39	5.17
INMCM	2.69	1.87	2.2	2.11	4.84	3.37	3.96	3.80
IPSL	2.65	2.18	2.82	2.12	4.77	3.92	5.08	3.82
MIROC_hi	2.84	2.77	3.16	2.81	5.11	4.99	5.69	5.06
MIROC_3.2	2.46	2.86	2.77	2.24	4.43	5.15	4.99	4.03
PCM1	1.15	0.77	1.91	1.38	2.07	1.39	3.44	2.48
average	1.83	1.72	2.57	1.98	3.29	3.09	4.63	3.56
REA	1.81	1.81	2.8	1.92	3.26	3.26	5.04	3.46

DJF = December, January, February
MAM = March, April, May
JJA = June, July, August
SON = Sept, October, Nov
REA = Reliability ensemble averaging

CLIMATE IMPACTS GROUP
For questions, please contact the Climate Impacts Group,
cig@u.washington.edu
July 2008

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BACKGROUND

The CCCSN was originally launched in February 2005 with support from Environment Canada, the Climate Change Adaptation Fund (CCAF) and the University of Regina. Since April of 2005, it has been wholly supported by Environment Canada and the Adaptation and Impacts Research Division (AIRD), along with university and other partners.

The CCCSN is based upon the Adaptation and Impacts Research Division (AIRD) network, which links development of the site with ongoing research at various AIRD nodes. The CCCSN continues to support climate change impact and adaptation research in Canada and other partner countries through the provision of GCM scenarios, RCM scenarios and downscaling tools. In addition, the CCCSN can provide high level technical support for downscaling and impacts and adaptation research, access to existing research, access to new research tools as they are developed at the AIRD nodes and training in the use of these tools. The CCCSN supports academic researchers as well as other stakeholders outside of academia who require scenario information for decision-making.

The CCCSN staff would like to acknowledge the contributions of the Canadian Climate Impacts Scenarios project (CCIS) to impact assessment research in Canada and the support CCIS provides to climate impact assessment in British Columbia.

A number of individuals and organizations have helped in the development of the CCCSN website. We thank them all for their efforts and contributions to the site.

THE NETWORK

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- Scenarios
- Downscaling Tools
- Publications
- Links
- News/Updates
- Help and Contact



Click on a region on the national map to go to that regional node contact (The content of the regional nodes is under development)

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Climate Change Concepts

- Climate **change** is defined as a difference over a period of time (with respect to a baseline or a **reference period**) and corresponds to a statistical significant trend of mean climate or its variability, persistent over a long period of time (e.g. decades or more). Climate change may be due to both natural (i.e. internal or external processes of the climate system) as well as anthropogenic forcings (ex. increase in concentrations of greenhouse gases);
- Climate **variability** is defined as a deviation from the overall trend or from a stationary state, and refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all temporal and spatial scales. Climate variability can be thought of as a short term fluctuation superimposed on top of the long term climate change or trend. Cycles of high and low values of weather events (drought, floods) are not climate change unless prolonged over many decades. Low frequency variability refers to phenomena such as the North Atlantic Oscillation or El Niño, which occur at a decadal scale or longer, and high frequency variability refers to meteorological events and their distribution (for example, frequency, duration and intensity) at yearly, seasonal or monthly timescales;
- Reference periods are typically 3 decades long (30 years, i.e. 1961-1990 is often used as a climatological baseline period in impacts and adaptation assessments and to quantify the anomalies in the future). These periods are of sufficient length to adequately represent the climate of the period, and are used to compare fluctuations of climate between one period and another. Also, given the substantial inter-decadal climatic variability exhibited by most GCMs, it's often difficult to distinguish a climate change signal from the background noise (i.e. the internal variability of the model or the model's representation of natural variability). For this reason, the IPCC (2001a) has recommended to use at least 30-year averaging periods for GCM output data. Conventionally, these reference period differences (future climate minus baseline climate) are used for model scenario comparison of most climate variables. The differences are also often expressed as ratios (future climate/baseline climate), or percentage differences between periods. Typically, a number of fixed time horizons in the future are produced from model output, e.g., the 2020s (2010-2039), the 2050s (2040-2069), and the 2080s (2070-2099).

Climate Change & Variability

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This section provides all the basic data needed to construct climate scenarios, from climate models (both global and regional models), as well as data used as input variables for statistical downscaling tools (see the [Downscaling Tools](#) section). Other data useful to validate climate models and/or to calibrate statistical downscaling tools are also provided here, as reanalysis products and observations. Other types of data are also supplied. Hence, the sub-sections have been organized to access various databases, namely:

- GCM – Global Climate Model (GCM)
- CRCM – Canadian Regional Climate Model (CRCM)
- Reanalysis – Reanalysis products
- Statistical Downscaling – Downscaling input
- Observations – Observations
- Other Data – Other data
- Data Links – Data links

Data available for download are at various temporal resolutions:

- Time series: climate variables at daily*, monthly, seasonal or annual scale;
- Period averages: average values over 3 decades (for the baseline period, and future periods) at monthly, seasonal or annual scale.

All time series and period average climate information are available for the **baseline period** (i.e. 1961-1990) and the three **future periods** (i.e. 2011-2040, 2041-2070, and 2071-2100, called 2020s, 2050s, and 2080s, respectively), if the model data is released.

Users requiring further information on the Canadian GCM programme are invited to visit the Canadian Centre for Climate Modeling and Analysis (CCCma), model information page: <http://www.cccma.bc.ec.gc.ca/models/models.shtml>.

*The daily data (time series) are only available for specific partners of the CCCSN and not the general public. A registration form must be completed in order to access the data (see registration link: <http://quebec.ccsn.ca/DAI/DAI-e.html>). Registration gives users access to data support and service. The daily Data Access Interface (DAI) has been developed for this

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CRCM data at the monthly, seasonal and annual scale can be downloaded directly from the CCCSN. Higher resolution data can be accessed through the [Data Access Interface \(DAI\)](#). The daily data (time series) are only available to authorized members and partners after the completion of a short [registration form](#). Registration gives users access to DAI's data support and service.

Click here for information on CRCM [Raw variables](#) and [Extreme variables](#)

- [Get Data](#)

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Modified : 2007-03-18
Reviewed : 2007-01-14
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http://loki.ouranos.ca/DAI/login-e.php



Data Access Integration

Welcome to DAI

The DAI data download gateway is made possible through a collaboration among the **Global Environmental and Climate Change Centre (GEC3)**, **Ouranos Consortium** on regional climate change and impacts, the **Adaptation and Impacts Research Division (AIRD)** of Environment Canada and the **Drought Research Initiative (DRI)**.

We ask you here to identify yourself so you will have access to the different sections of DAI. If you are not already registered, you may do so right now by clicking the **Register** button below. You can also log in as a **Guest**. You will be able to browse all DAI available data but not submit a data request. If you are already registered but have forgotten your passcode, please refer to the last line.

The DAI team.

Please identify yourself to have access to DAI

Email:

Access code:

Connect **Register** **Guest**

You forgot your passcode ? Please enter your email address and [click here](#)

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SDSM

ASD

SDSM

LARS-WG

Statistical Downscaling

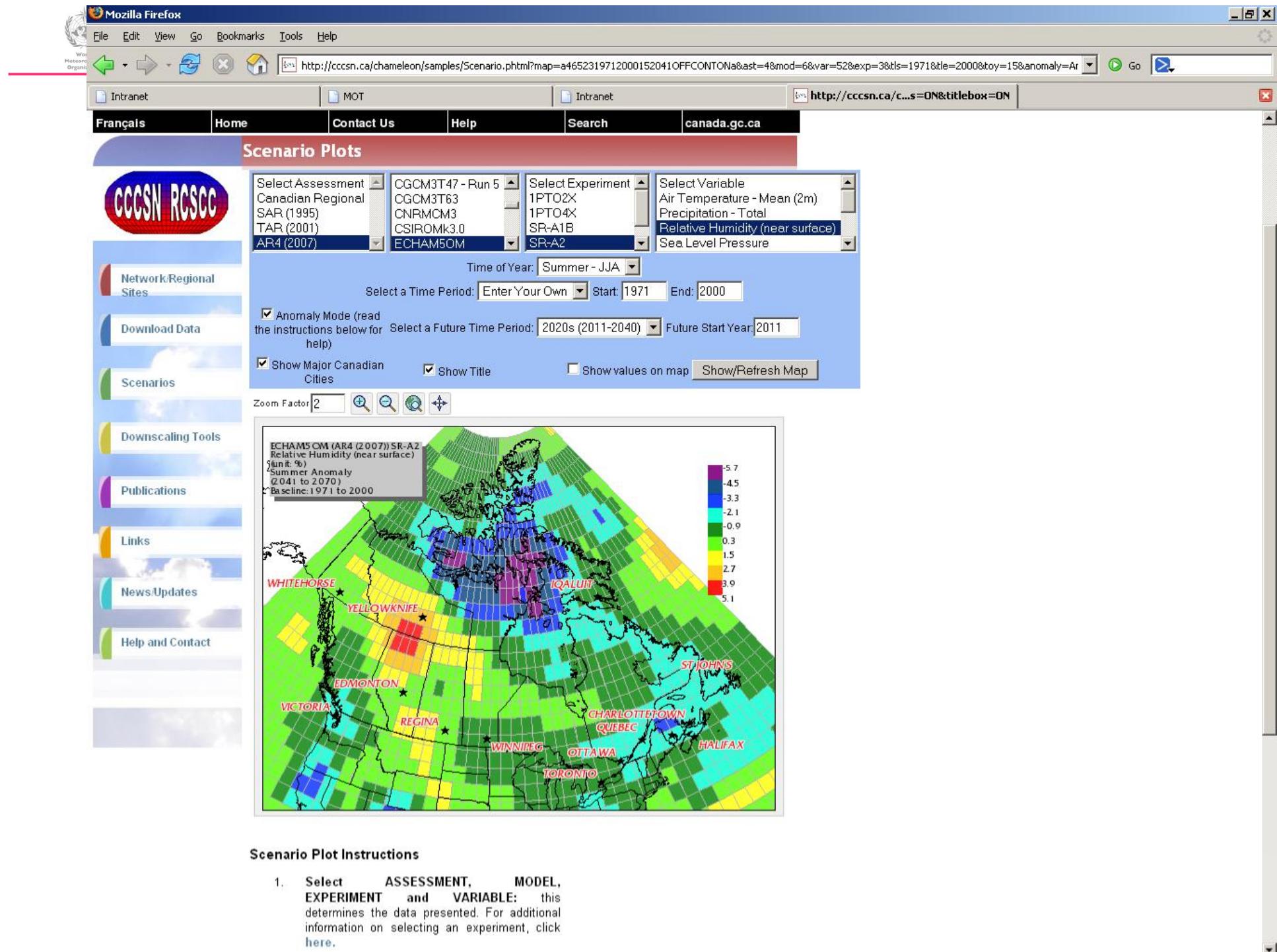
Input

Although there is no 'standard' approach to downscaling, (i.e. obtaining finer resolution scenarios of climate change from the coarser resolution GCM output), there are two pieces of software currently available which can be used to undertake spatial and temporal downscaling. A third, the Automated Statistical Downscaling (ASD) Tool will be available on this website soon.

- SDSM, a Statistical DownScaling Model, developed by Rob Wilby and Christian Dawson in the UK, and
- LARS-WG, a stochastic weather generator developed by Mikhail Semenov and Elaine Barrow, also in the UK.

SDSM permits the creation of daily predictor-predictand relationships using multiple linear regression techniques. The predictor variables provide daily information concerning the atmosphere, whilst the predictand describes conditions at the site scale. The task of statistically downscaling daily weather series into a number of monthly screening of potential downscaling predictor variables - identifies large-scale predictor variables which are significantly correlated with local station (predictand) data. A number of variables derived from mean sea level pressure fields are included, e.g. air flow strength, meridional and zonal components of air flow, vorticity etc. (see Statistical Downscaling Input, in Download Data section);

2. Assembly and calibration of statistical downscaling model(s) - the large-scale predictor variables identified in (1) are used in the determination of multiple linear regression relationships between these variables and the local station data. Statistical models may be built on a monthly, seasonal or annual basis. Information regarding the amount of variance explained by the model(s) and the standard error is given in order to determine the viability of spatial downscaling for the variable and site in question;
3. Synthesis of ensembles of current weather data using observed predictor variables - once statistical downscaling models have been determined they can be verified by using an independent data set of observed predictors. The stochastic component of SDSM allows the generation of up to 100 ensembles of data which have the same statistical characteristics but which vary on a day-to-day basis;
4. Generation of ensembles of future weather data using GCM-derived predictor



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Longitude: -93.759° Latitude: 41.9800

Select a Time Period: 1961-1990
(This will be reflected on the start/end year entries below)

Start Year: 1961 End Year: 1990
Projection Start year: 2041

Time of Year: Annual

Select output type: JPG PNG

Plot a straight line between the future time periods

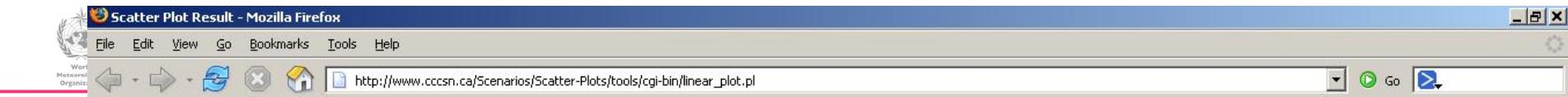
Select output size: Medium (1200 x 800) Small (600 x 400) Large (2100 x 1400)

Select Assessment Canadian Regional SAR (1995) TAR (2001) AR4 (2007)

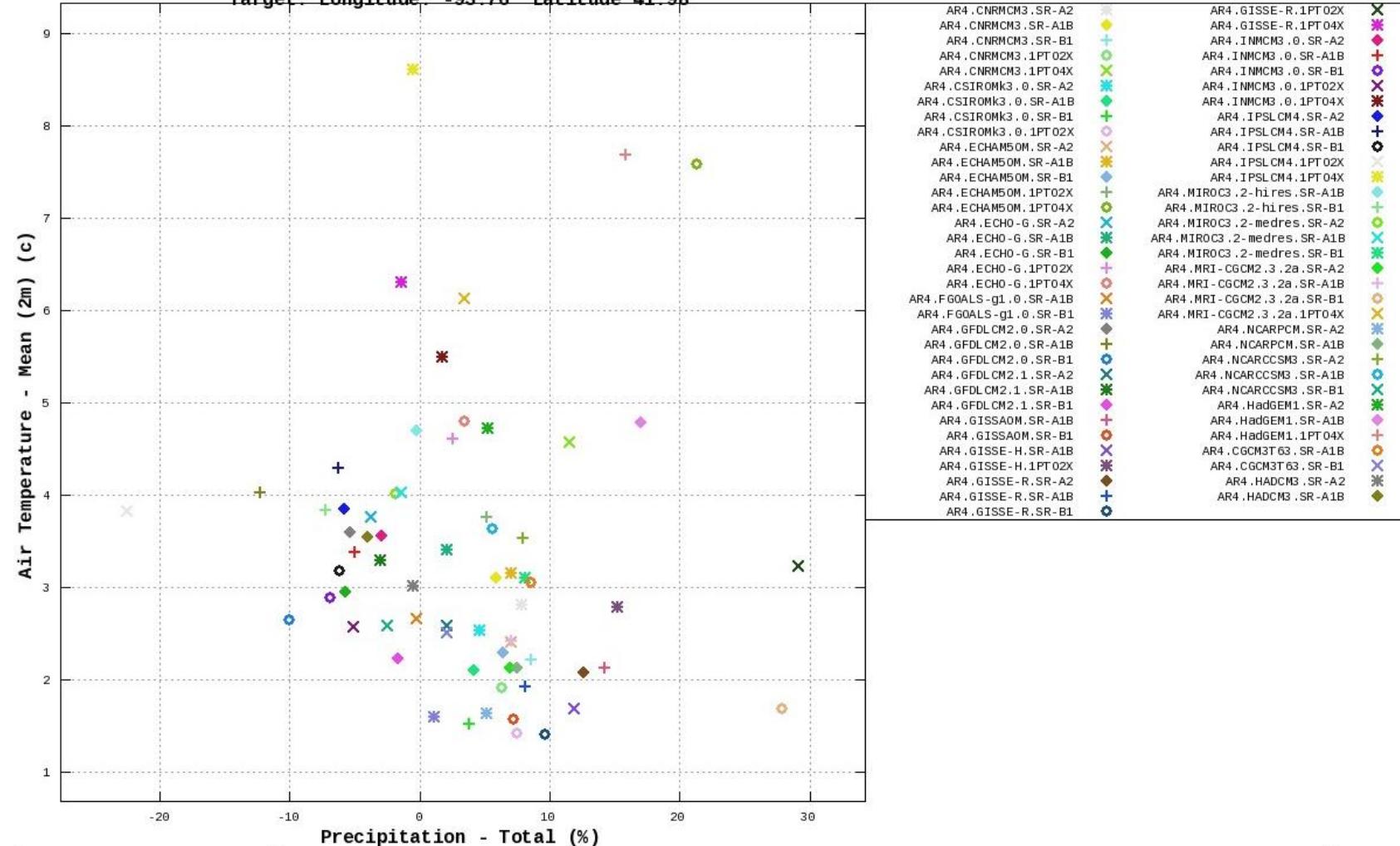
Select Variable Air Temperature - Extreme Range (2m)
Air Temperature - Mean (2m)
Air Temperature - Mean Max (2m)
Air Temperature - Mean Min (2m)
Consecutive Dry Days

CGCM3T47 - Run 5
CGCM3B3
CNRMCM3
CSIROMK3.0
ECHAM50M
ECHO-G

Get Data



Parameter: Air Temperature - Mean (2m) Anom, Units: c
 Parameter: Precipitation - Total Anom, Units: %
 PCC Assessment: AR4, Time of Year: Annual, Baseline:1961-1990 Anomaly: 2041-2070
 Target: Longitude: -93.76 Latitude 41.98



Experiment	2056			
	Baseline:1961-1990	Parameter: Air Temperature - Mean (2m) Anom, Units: c	Baseline:1961-1990	Parameter: Precipitation - Total Anom, Units: %
AR4.CNRMCM3.SR-A2	6.589	2.809	2.612	7.878
AR4.CNRMCM3.SR-A1B	6.589	3.105	2.612	5.912
AR4.CNRMCM3.SR-B1	6.589	2.213	2.612	8.609

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Longitude: -93.759 Latitude: 41.9800

Select a Time Period: 1961-1990
(This will be reflected on the start/end year entries below)

Start Year: 1961 End Year: 1990
Projection Start year: 2041

Time of Year: Annual

Select output type: JPG PNG
 Plot a straight line between the future time periods

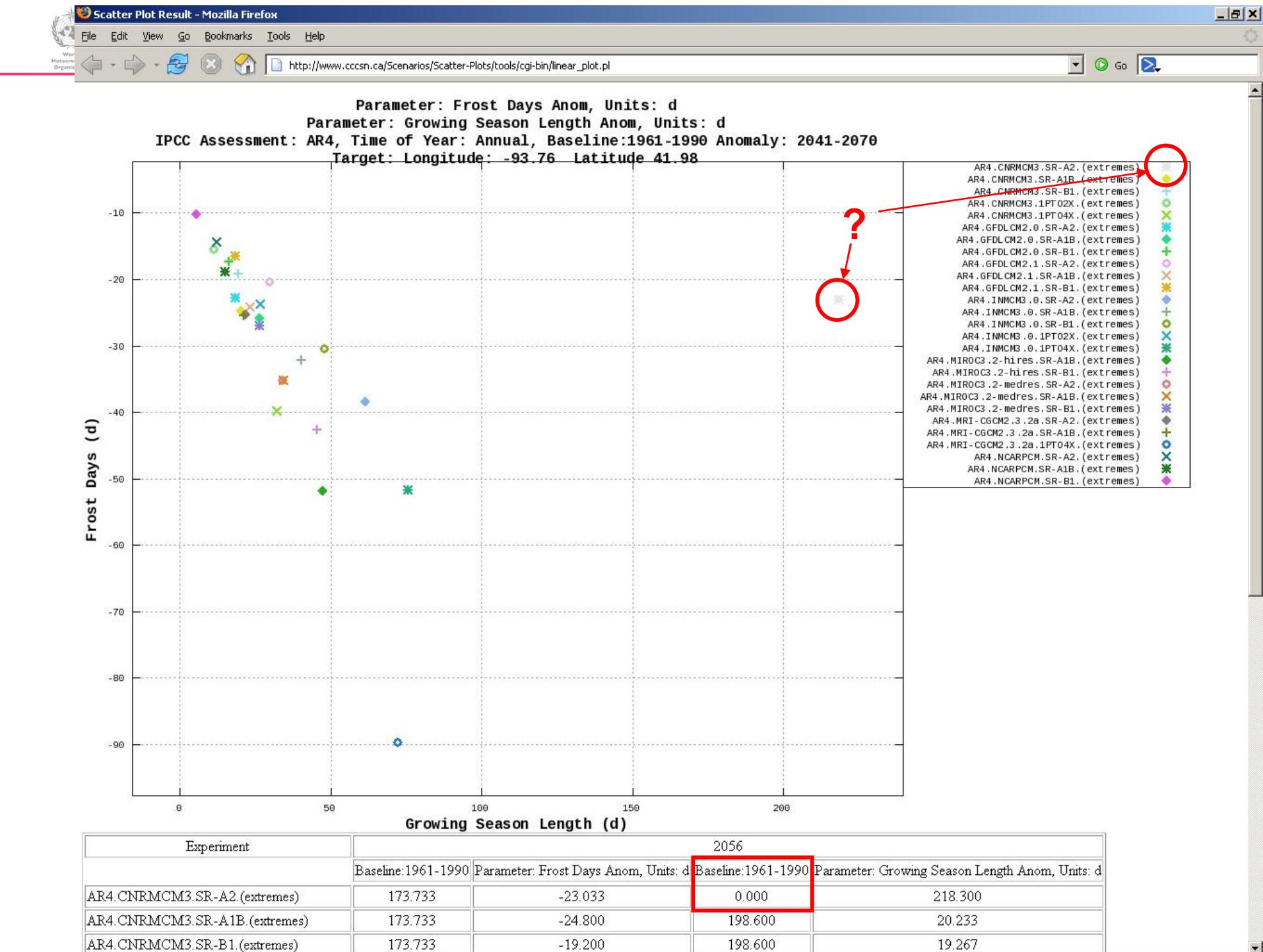
Select output size: Medium (1200 x 800) Small (600 x 400) Large (2100 x 1400)

Select Assessment: Canadian Regional SAR (1995) TAR (2001) AR4 (2007)

Fraction of Annual Total Prec. > 95th Percentile
Fraction of Time (90th percentile min temp)
Frost Days
Growing Season Length
Heat Wave Duration
Precipitation - 5 Day Max

GFDL-CM2.1
INMCM3.0
MIROC3.2 hires
MIROC3.2 medres
MRI CGCM2.3.2a
NCARPCM

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Bioclimate

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Select Assessment Canadian Regional SAR (1995) TAP (2001) AR4 (2007)

GISSE-R HADCM3 HadGEM1 INMCM3.0 IDIOMA

Select Experiment SR-A1B SR-A2 SR-B1

Select an Analysis HDD & CDD Monthly GDD Water Surplus and Deficit

Image Format: (.jpg) (.png)

Image Size (WxH): 600 x 400 1200 x 800 2100 x 1400

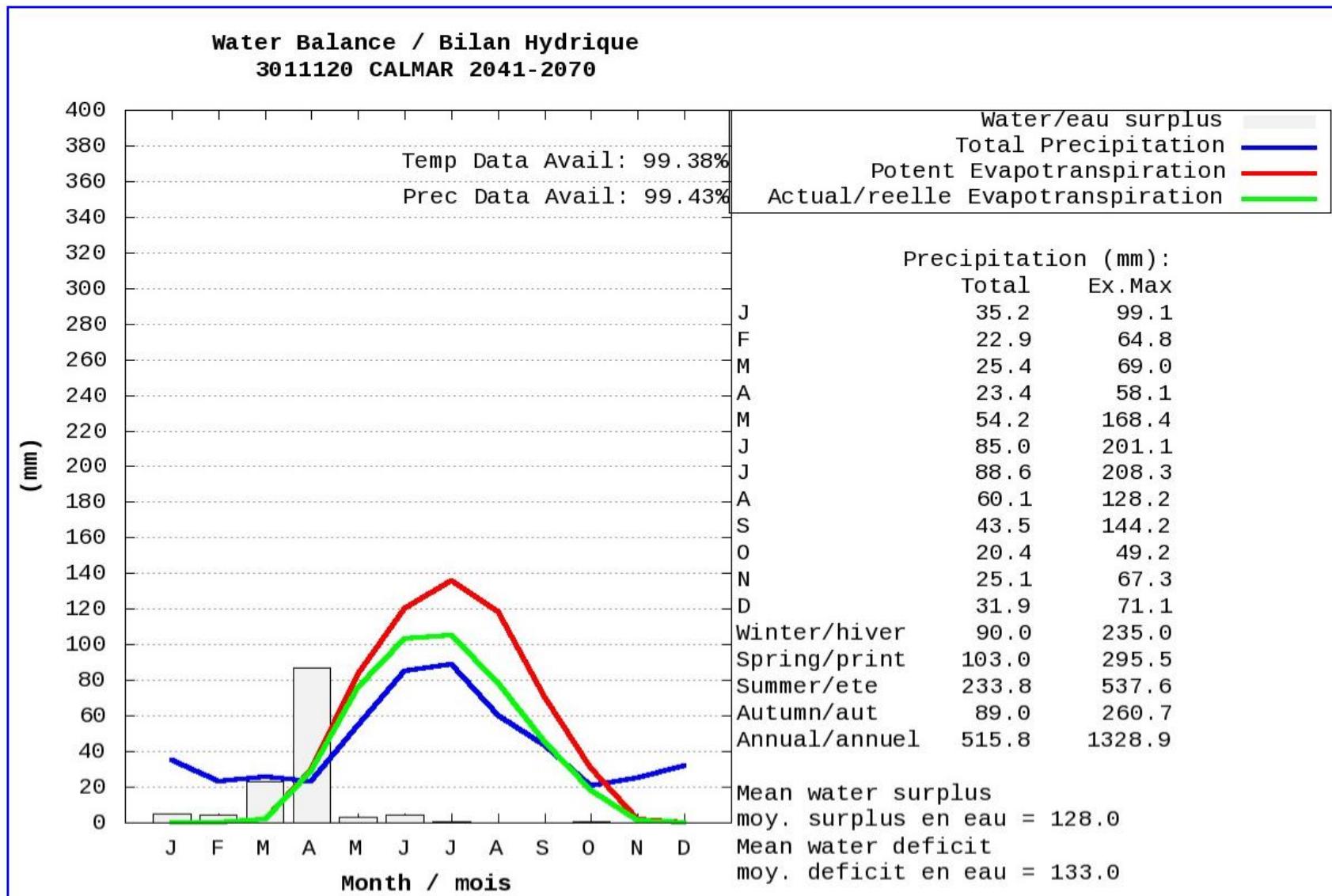
Select a Time Period: 2050s (2041-2070)

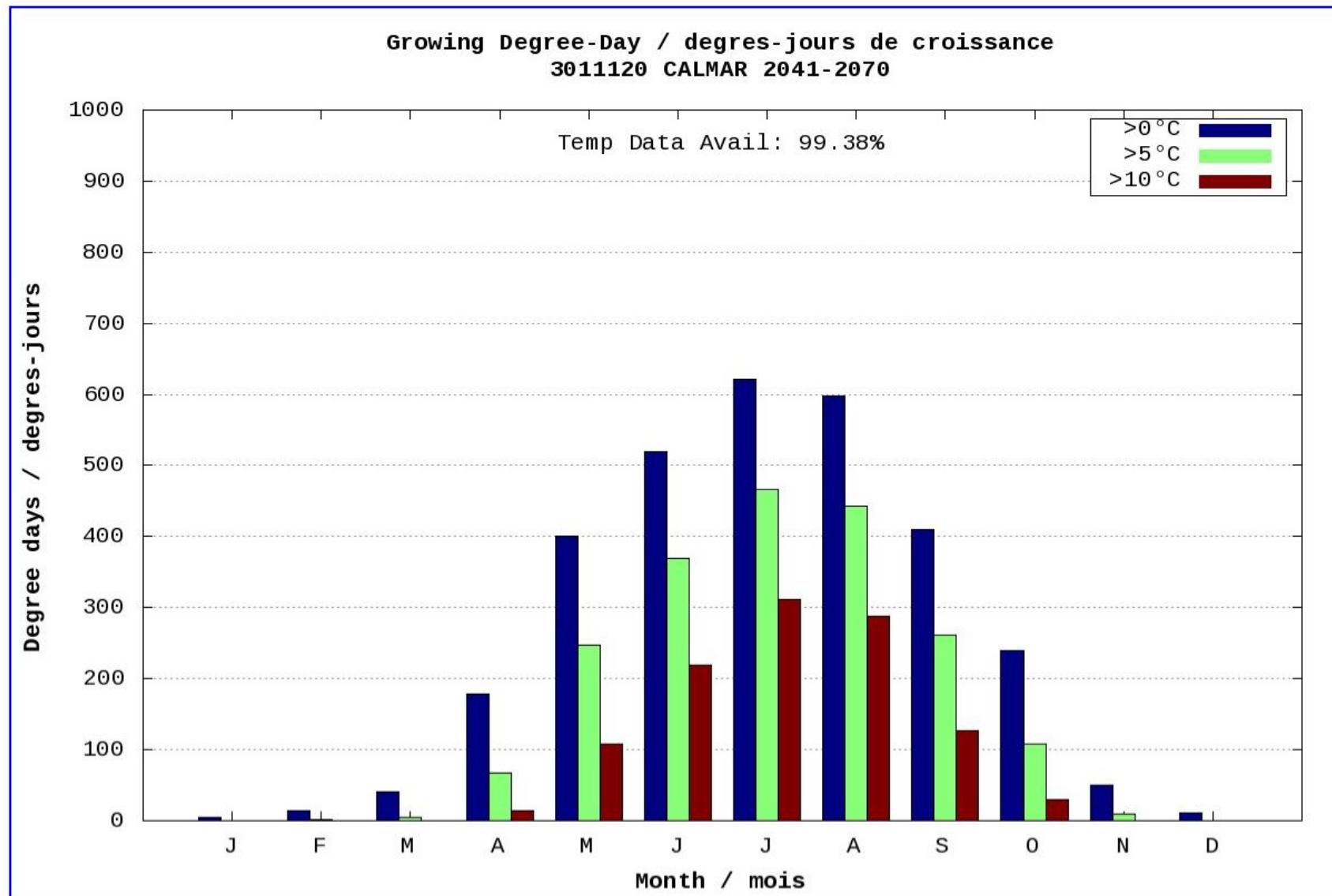
Zoom Factor 2 Select Model, Analysis, Timeslice etc. above...

ALERT EUREKA MOLDBAY A KOMAKUK BEACH A TUKTUY ARTLIK INUMIK MAYO A ATLIN TESLIN A Whitehorse YOHIN DEASE LAKE HAY RIVER A FORT NELSON A PRINCE RUPERT A CAMBRIDGE BAY A INUVIK A CLINTON POINT HALL BEACH A BYRON BAY A CORAL HARBOUR A BAKER L'AKE A KUILLUQA A CARTWRIGHT GOOSE A BONAVISTA Victoria KLINTONEL PIERSON SOUTHERN BAY A THE PAS A THOMPSON A RIVERE AUTONNERRE MOOSONEE LA CHAPAS 2 AMOS SYDNEY A Hallifax MILAN YARMOUTH A ST ANICET CRESSY WINDSOR A WESTMINSTER TWP WPCP

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KNMI Climate Scenarios

Current KNMI'06 scenarios

01-09-2008

Based on the most recent results from climate research, KNMI has developed four climate scenarios for the Netherlands; indicated by G, G+, W and W+. They replace the scenarios that were drawn up in 2000 for the National Commission on Water management in the 21st century (WB21; see Previous generation scenarios).

A schematic overview of these KNMI'06 climate scenarios is shown in Figure 1. In Table 1 the climate change in the year 2050 is expressed in numbers for each scenario. Scientific background information on how these scenarios have been constructed can be found in the [Methodology](#) section, in the KNMI'06 scenario report and in several scientific papers published in the international literature (see Further reading). The contents of these webpages is taken from the KNMI'06 scenario brochure.

Air circulation patterns

The diagram illustrates the four KNMI'06 climate scenarios. It features four colored circles representing the scenarios: G (green, bottom left), G+ (yellow, top left), W (purple, bottom right), and W+ (red, top right). A vertical bar on the left indicates 'Air circulation patterns' with 'changed' at the top and 'unchanged' at the bottom. Two horizontal arrows point to the right, labeled '+ 1°C' and '+ 2°C'. The '+ 1°C' arrow points to G and G+, while the '+ 2°C' arrow points to W and W+. A large red arrow at the bottom right points to the text 'Global temperature in 2050 compared to 1990'.

KNMI Climate Scenarios

- Homepage
- Current KNMI'06 scenarios
- Methodology
- Relation with IPCC
- Temperature
- Precipitation
- Windstorms
- Sea level
- Previous generation scenarios...
- Future generation scenarios...
- Additional and foreign scenarios...
- Suggestions for usage
- FAQs on scenarios...

More climate data and services

- Monitoring observed changes...
- Tailoring for application sectors

Further reading

- Brochure KNMI'06 scenarios
- Scientific report KNMI'06 scenarios
- KNMI'06 scientific papers
- IPCC Fourth Assessment Report
- Relation IPCC - KNMI'06 (in Dutch)
- Climate Explorer

Contact us

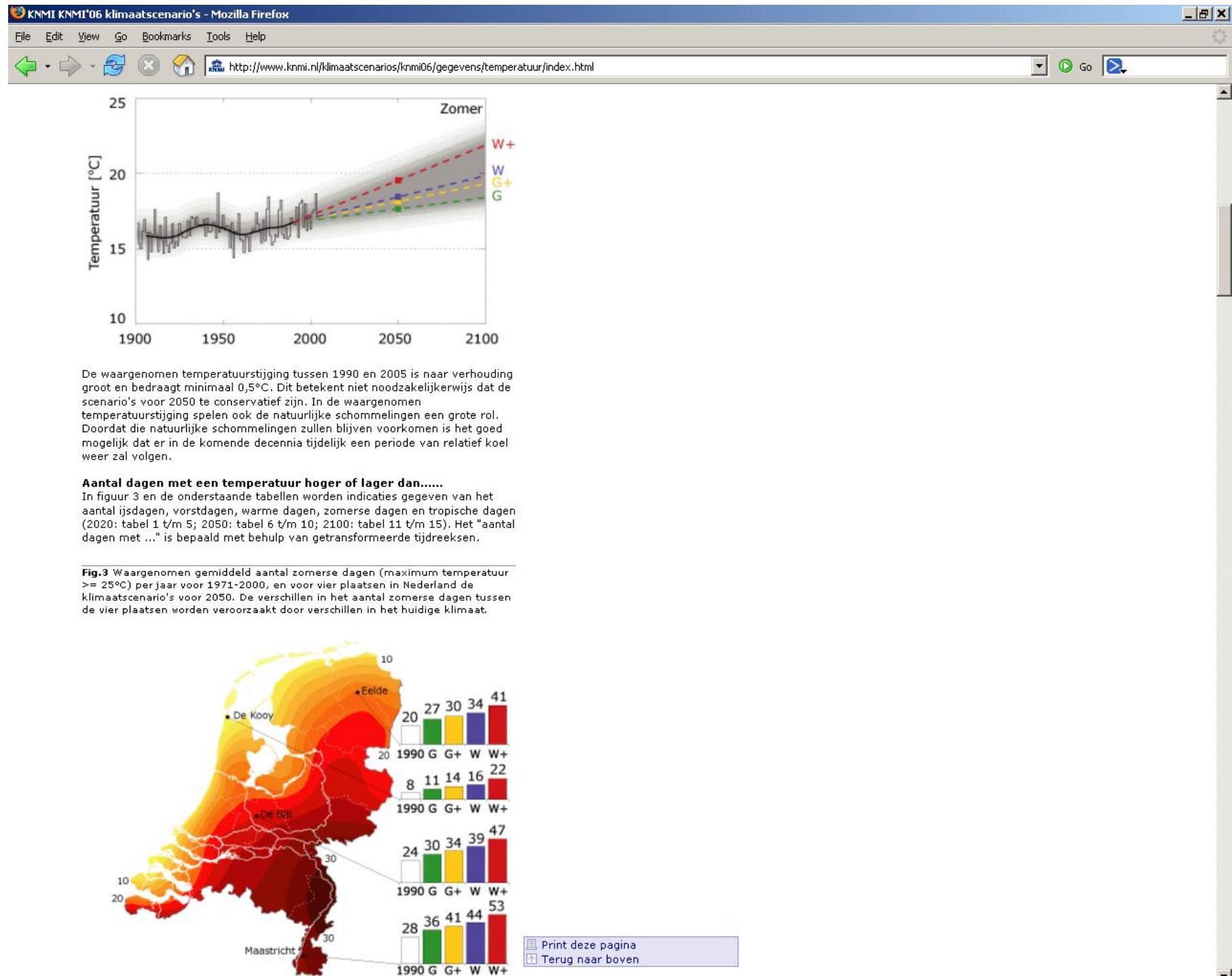
- KNMI Climate Services

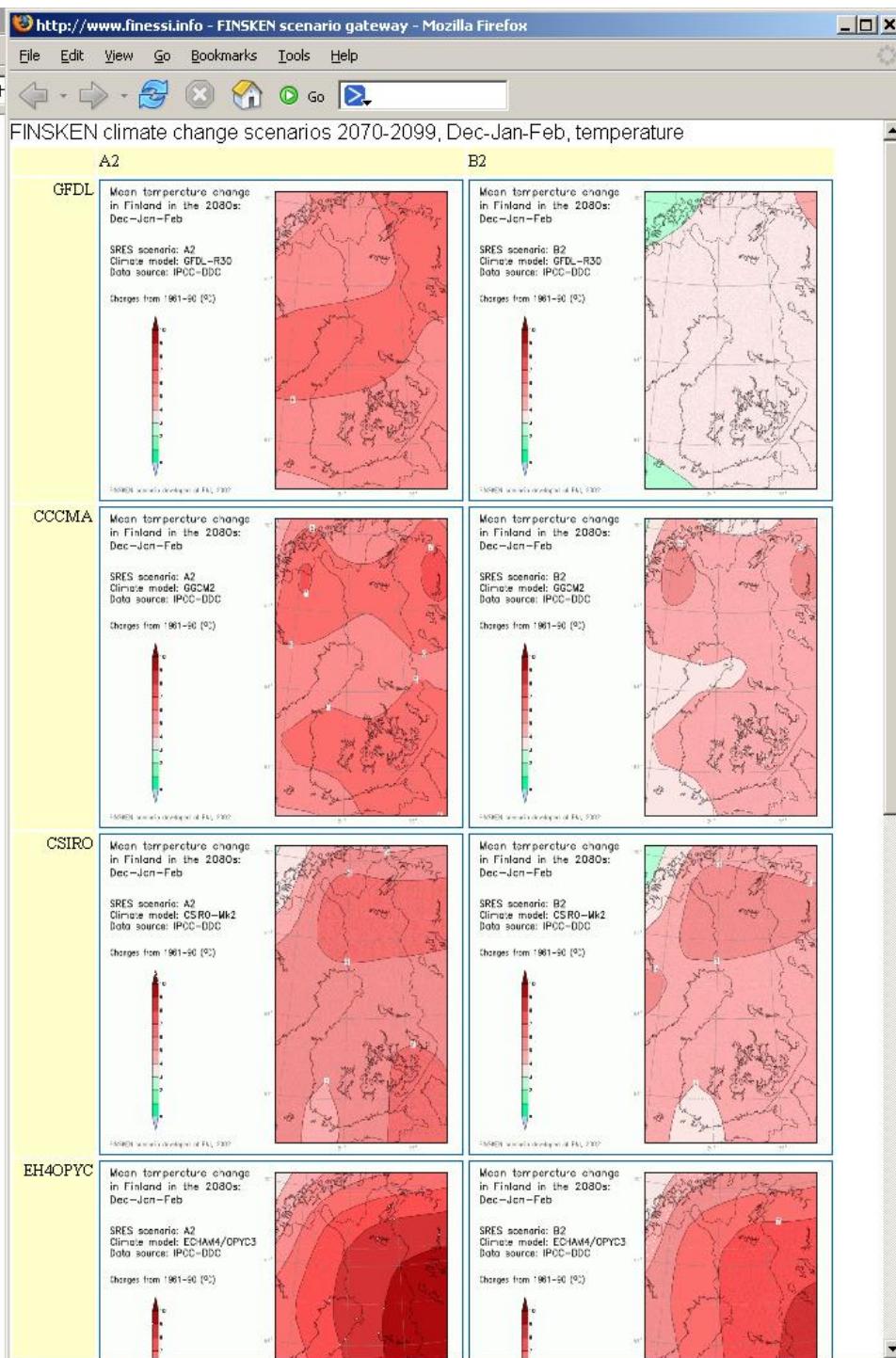
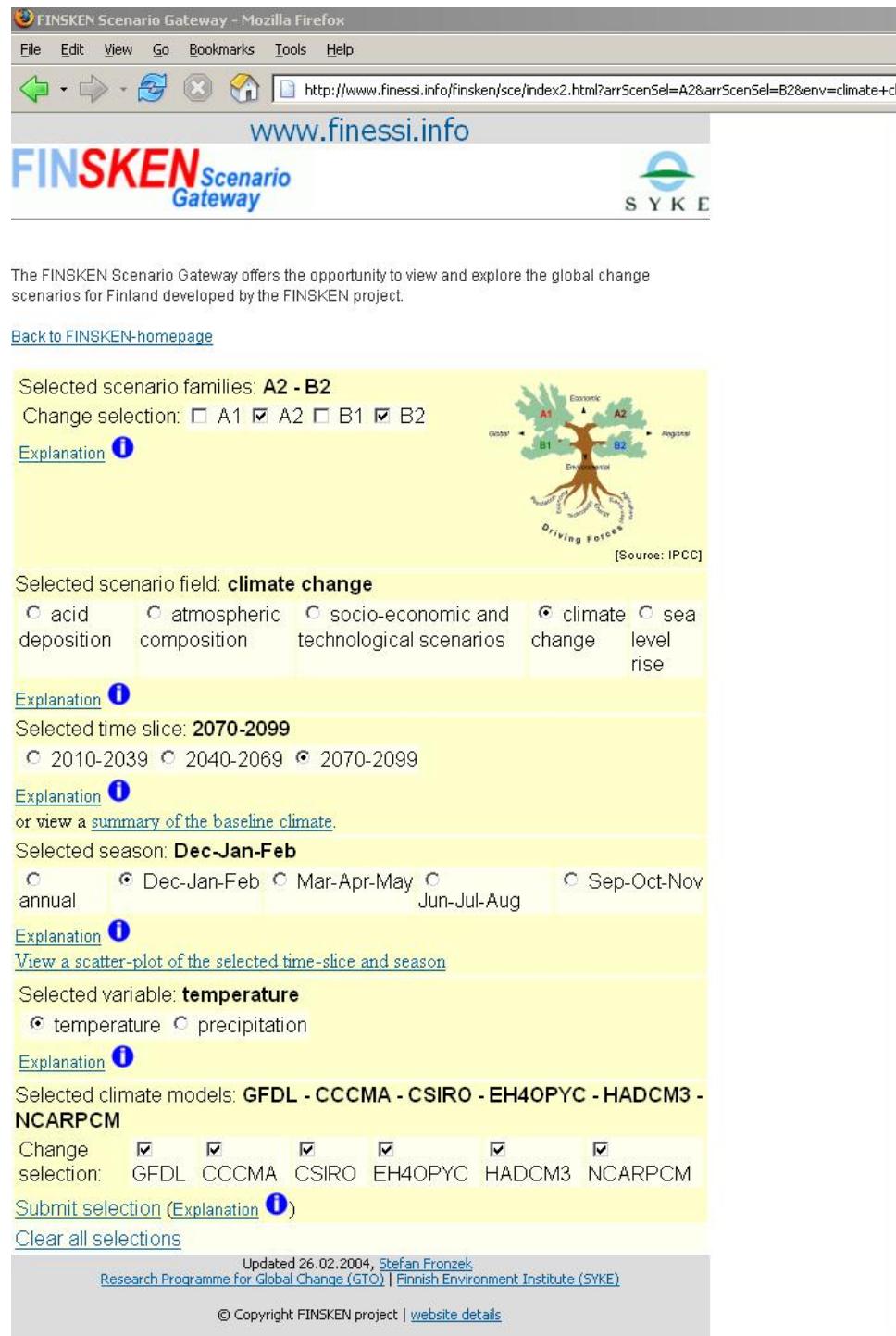
G Moderate*	1°C temperature rise on earth in 2050 compared to 1990 no change in air circulation patterns in Western Europe
G+ Moderate +	1°C temperature rise on earth in 2050 compared to 1990 + milder and wetter winters due to more westerly winds + warmer and drier summers due to more easterly winds
W Warm	2°C temperature rise on earth in 2050 compared to 1990 no change in air circulation patterns in Western Europe
W+ Warm +	2°C temperature rise on earth in 2050 compared to 1990 + milder and wetter winters due to more westerly winds + warmer and drier summers due to more easterly winds

Figure 1 Schematic overview of the four KNMI'06 climate scenarios. 'G' is derived from 'Gematigd' = Dutch for 'Moderate'.

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To top of page





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 OzClim



USE OZCLIM

[TERMS OF USE]

Step-by-step ...

A step-by-step guide to using OzClim.

Examples ...

Choose from a selection of most requested scenarios.

Advanced ...

Create your own scenarios (for the technical practitioner).

Welcome to OzClim

Exploring climate change scenarios for Australia

With OzClim you can:

- generate climate change scenarios in a few easy steps
- explore temperature and rainfall climate scenarios from 2010 to 2100
- be guided through the process of generating your own climate scenarios
- download maps and scenario data for use in non-commercial research

OzClim provides a simple [step-by-step](#) option to help you generate and explore climate scenarios. There are also six scenarios in the [examples](#) section for rainfall and temperature for 2030.

The [advanced](#) section is designed for the scientific research community and policy making. Choose from eight climate models, eight emission scenarios and three climate sensitivities.

Want to know more?

Learn more about climate scenarios in the [science](#) section. Climate terminology is explained in the [glossary](#) provided by the Intergovernmental Panel on Climate Change (IPCC). On-line help is available throughout this website.



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http://www.csiro.au/ozclim/help/faq.jsp#Q8

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 **OzClim** 

Home > FAQ

Frequently Asked Questions

1. [Can I generate a mean temperature or mean rainfall climate change scenario?](#)
2. [What is the difference between selecting "change from 1990" or "future climate"?](#)
3. [Which years can I generate a scenario for?](#)
4. [Can I generate a scenario for a particular season or annual average?](#)
5. [Within the step-by-step section of OzClim, can I select the rate of global warming I am interested in?](#)
6. [Within the step-by-step section of OzClim, can I select the type of regional change I am interested in?](#)
7. [Which impact models are included with OzClim?](#)
8. [What climate scenario should I use for my impact model?](#)

Can I generate a mean temperature or mean rainfall climate change scenario?

Yes. OzClim allows climate scenarios to be generated for mean temperature or mean rainfall.

Choosing **mean temperature** will produce a map of the mean temperature or mean temperature change for the year, season, global and regional pattern of change selected.

Choosing **mean rainfall** will produce a map of the mean rainfall or mean rainfall change for the year, season, global and regional pattern of change selected.

[TOP](#)

What is the difference between selecting "change from 1990" or "future climate"?

A climate scenario can be generated as the change in climate from 1990, the "base climate", or at a year in the future.

Select **show change from 1990** if you want to see how the temperature or rainfall will change from 1990 for your selected year (you will be able to select the year in **Step 2**). For example: how much drier will it be in the north west of Victoria in the year 2030?

Select **show future climate** if you want to see a temperature or rainfall scenario for a particular year in the future (you will be able to select the year in **Step 2**). For example: What will the annual average rainfall be in the north west of Victoria in the year 2030?

[TOP](#)

Which years can I generate a scenario for?

Climate scenarios can be generated for years 2010 to 2100 in five year increments.

Select the year for which the scenario is to be generated. For example, selecting 2030 will show the mean temperature or mean rainfall for that year dependent on the other scenario parameters selected.

[TOP](#)

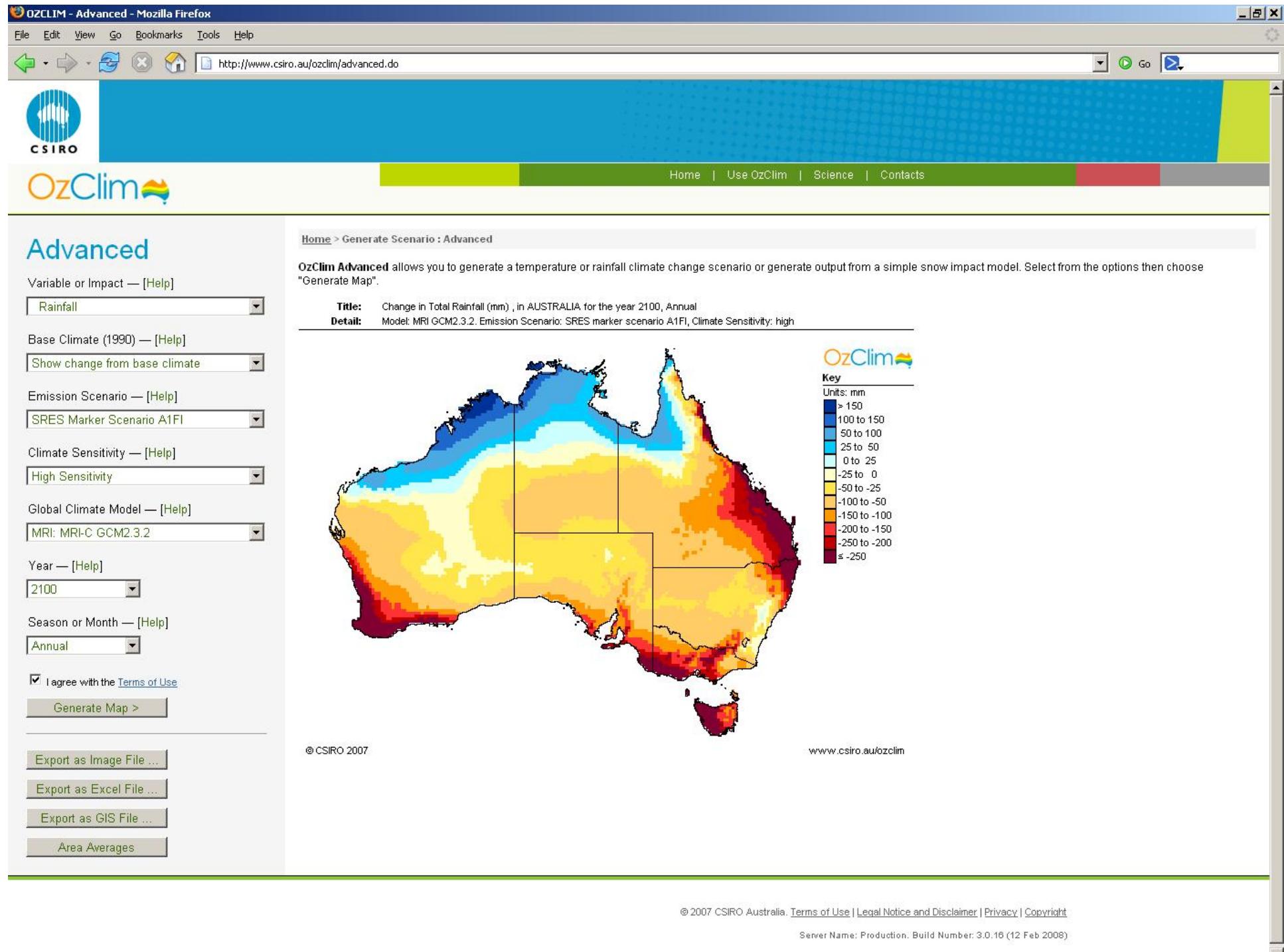
Can I generate a scenario for a particular season or annual average?

Yes. You can select the **Australian season** for which the scenario is to be generated for the year selected. For example, selecting **Summer** will show the mean temperature or mean rainfall for the months December, January and February for the year selected. Selecting **Annual** will average the results of the scenario across the entire year selected.



Related Links

- [Department of Climate Change](#)
- [Climate Change in Australia](#)
- [CSIRO Climate and Weather](#)
- [Australian Bureau of Meteorology](#)
- [Intergovernmental Panel on Climate Change](#)
- [IPCC Special Report on Emissions Scenarios](#)
- [The Impact of climate change on snow conditions in mainland Australia](#)





scenariosgateway

[Introduction](#) [Overview](#) [Guidance](#) [UKCIP02](#) [UKCIP02 extras](#) [UKCP09](#) [Feedback](#) [UKCIP](#)

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UK Climate Projections 2009

UKCP09

[About UKCP09](#)[UKCP09 in context](#)[What information will be provided by UKCP09?](#)[Using UKCP09](#)[Find out more](#)

The next package of climate change scenarios for the UK have the full title of *UK Climate Projections* and will be known as UKCP09 or the Projections for short.

The information provided on these pages provided here is intended to support the development of the UKCP09 scenarios between now and their launch in early 2009.

[About UKCP09](#) provides a starting point for learning about UKCP09. The page also contains the [latest news](#) about the development of UKCP09 and explains who is doing what.

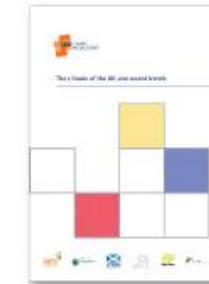
[UKCP09 in context](#) discusses why UKCP09 will take the form it will, including consideration of past UK climate change scenarios, current user requirements and recent advances in climate science.

[What information will be provided by UKCP09?](#) examines what information UKCP09 can be expected to provide. A 'technical briefing' section gives more detail about the science behind UKCP09 and the methods used.

[Using UKCP09](#) looks at UKCP09 from a user perspective, including how the information will be provided and what outputs can be expected. Also provided here are details of the planned training and guidance to support use of UKCP09, information about the UKCP09 Users' Panel, FAQs and a glossary of terms.

[Finding out more](#) offers suggestions of where to go for more information about UKCP09, including web-links, downloads and publications.

UKCP09 remains work in progress and the information provided here is not final and is liable to change.

[Back to top](#)

The first of the three UKCP09 science reports, *The climate of the UK and recent trends*, first published in December 2007 and revised January 2009, is available [here](#).

Examples of probabilistic climate projections

UK Climate Impacts Programme - UKCP09: Using UKCP09 - Mozilla Firefox

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http://www.ukcip.org.uk/index.php?option=com_content&task=view&id=262&Itemid=356

scenariosgateway

UK Climate Impacts Programme

Introduction Overview Guidance UKCP02 UKCP02 extras UKCP09 Feedback UKCIP search this site...

UKCP09: Using UKCP09

Using UKCP09

How will information be provided?

What outputs will be available?

User training

User guidance

Users' panel

Glossary

How will the information be provided to users?

The information that will be provided by UKCP09 can usefully be divided into three main types:

- Key Findings / Headline Messages
- Published Material
- Customisable Output

Further details about each type is provided below. This information has been reproduced (and updated) from the [UKCP09 booklet](#).

Key Findings / Headline Messages

A set of Key Findings will give a national overview of the main changes described by UKCP09.

A set of Headline Messages provide some context to the key findings with each region drawing out what those findings mean for their region.

Published material

There will be four separate science reports available online:

- a science report on observed UK climate and recent trends;
- a science report on the probabilistic climate projections over land;
- a science report on the weather generator projections
- a science report on the marine projections.

A [briefing report](#) will provide a summary of the three science reports.

An online collection of [pre-prepared maps & graphs](#) will be provided to illustrate some of the projected changes.

Customisable output

Probabilistic climate projections:

The UKCP09 User Interface will allow customisable image products such as maps, probabilistic plots (PD Curves, CD Curves), plume diagrams and scatter graphs to be created.

The User Interface will allow customisable numerical products such as GIS-format files and underlying model outputs to be obtained, which can be used as input to impacts models.

Weather Generator and Threshold Detector:

The User Interface will also include an integrated weather generator, a tool that will provide a statistical expression of baseline and projected climate at daily time-scales that is consistent with the UKCP09 probabilistic climate projections. There will be a stand alone threshold



ILMATIETEEN LAITOS



[Sää ja ilmasto](#) · [Ilmanlaatu](#) · [Tutkimus](#) · [Tuotteet ja palvelut](#) · [Uutiset](#) · [Organisaatio](#)

Haku

[Arvot ja visio](#)

Organisaatio | Yhteystiedot | ILM - Ilmastotutkimus - ACCLIM-hanke - Tuloset - ACCLIM-taulukot lämpötila

[Historia](#)

LÄMPÖTILAN MUUTOSKENAARIOITA (YKSIKKÖ °C)

Yhteismitallistetut keskilämpötilan muutosskenaariot neljälle 30-vuotisjakosolle, vertailukohdana jakso 1971-2000.

[Kansainvälisyys](#)

Muutosarvioissa on huomioitu samalla kertaa sekä mallien että kasvihuonekaasuskenaarioitten erilaisuus. Muutokset on laskettu vuoden 12 kuukaudelle ja lisäksi erikseen neljälle vuodenajalle.

[Työpaikat](#)

Muutokset ovat koko Suomen yli laskettuja keskiarvoja. Kussakin kohdassa on taulukoitu 7 kpl jakauman prosenttipisteitä (5, 10, 25, 50, 75, 90 ja 95%).

[Talous](#)

Arvot perustuvat 19 maailmanlaajuisen ilmostomallin tuloksiin. Tuottanut Ilmatieteen laitos 22.5.2008. Lisätietoja: Kimmo Ruosteenoja (sähköposti etunimi.sukunimi@fmi.fi).

[Vuosikertomus](#)

Käytösesimerkki: Haetaan toukokuun (V kuukausi) mediaanimuutos jaksolle 2040-2069. Etsitään ko. taulukosta 50%:n kohdalta lukuarvo, joka on 2.3°C.

[Yhteystiedot](#)

Tarkasteltava jaksot 2010-2039

[Palvelunumerot](#)

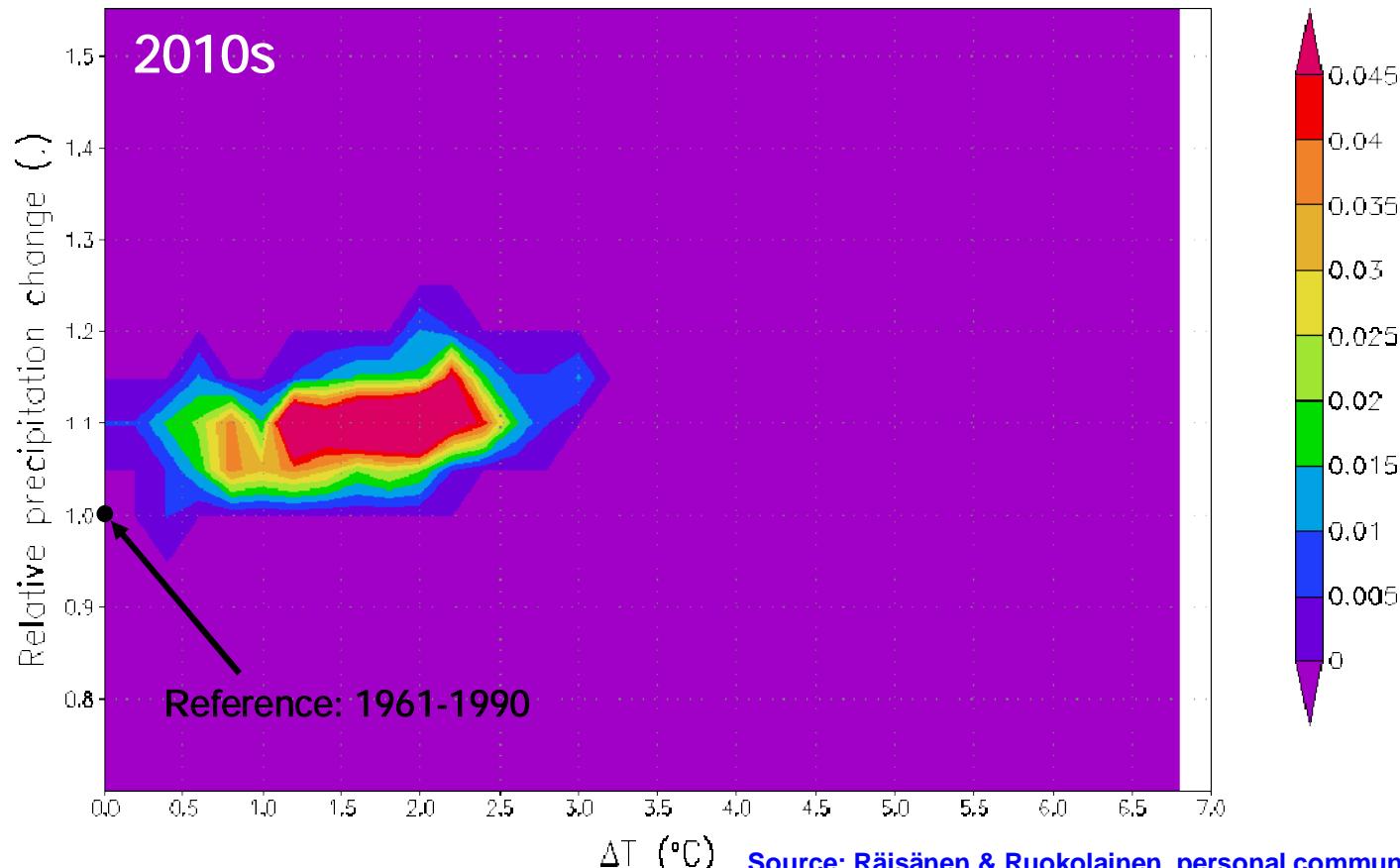
KK/Vuodenaika	5%	10%	25%	50%	75%	90%	95%
I	1,2	1,5	1,9	2,3	2,8	3,2	3,5
II	0,9	1,2	1,7	2,2	2,6	3,1	3,4
III	0,5	0,8	1,3	1,8	2,3	2,7	3,0
IV	0,4	0,7	1,0	1,4	1,8	2,1	2,3
V	0,2	0,4	0,8	1,2	1,6	2,0	2,2
VI	0,3	0,5	0,8	1,2	1,5	1,9	2,1
VII	0,1	0,3	0,6	1,1	1,5	1,9	2,1
VIII	-0,2	0,1	0,5	1,0	1,5	1,9	2,2
IX	0,3	0,5	0,8	1,1	1,4	1,6	1,8
X	0,5	0,7	0,9	1,2	1,5	1,7	1,8
XI	1,0	1,2	1,6	2,0	2,5	2,9	3,1
XII	1,0	1,3	1,7	2,2	2,7	3,1	3,4
TALVI	1,0	1,3	1,7	2,2	2,7	3,1	3,4
KEVÄT	0,4	0,6	1,0	1,5	1,9	2,3	2,5
KESÄ	0,1	0,3	0,7	1,1	1,5	1,9	2,1
SYKSY	0,6	0,8	1,1	1,4	1,8	2,1	2,2

[» På svenska](#)

[» In English](#)

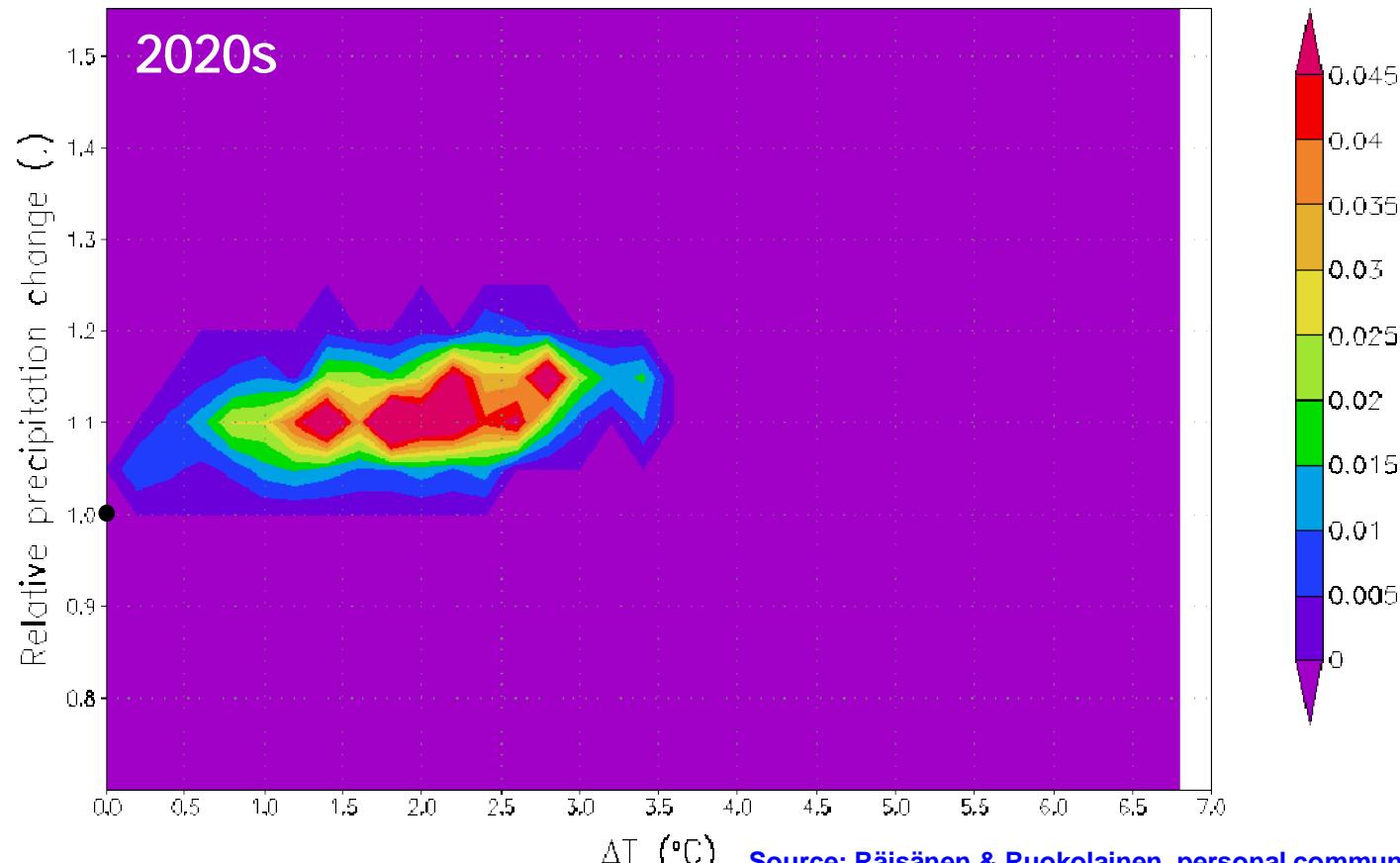
Joint probabilities of 30-year mean changes in mean annual temperature ($^{\circ}\text{C}$) and precipitation (proportion) relative to 1961-1990 for Finland based on an ensemble of AR4 AOGCM simulations assuming A1B emissions

2001–30



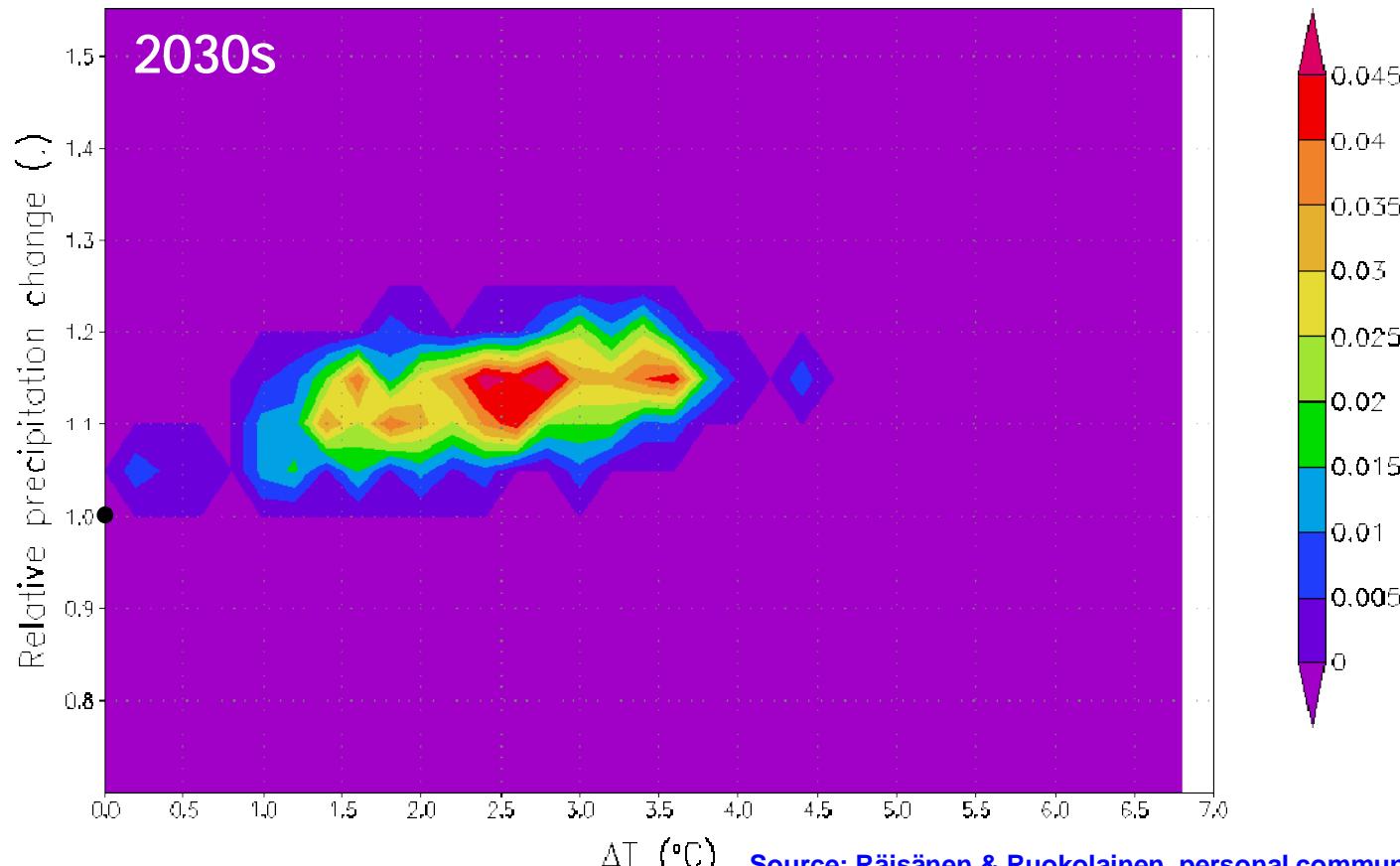
Joint probabilities of 30-year mean changes in mean annual temperature ($^{\circ}\text{C}$) and precipitation (proportion) relative to 1961-1990 for Finland based on an ensemble of AR4 AOGCM simulations assuming A1B emissions

2011-40



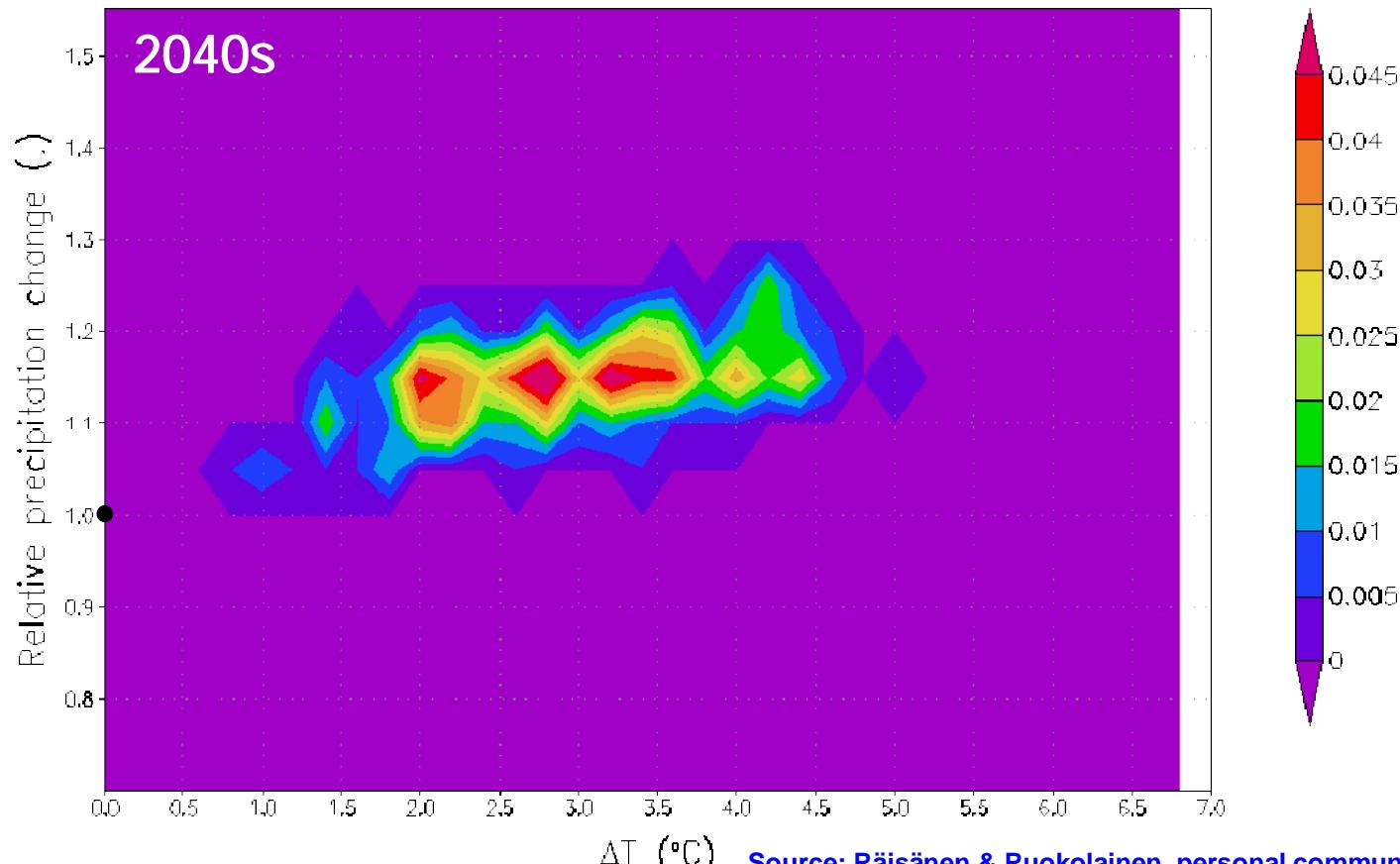
Joint probabilities of 30-year mean changes in mean annual temperature ($^{\circ}\text{C}$) and precipitation (proportion) relative to 1961-1990 for Finland based on an ensemble of AR4 AOGCM simulations assuming A1B emissions

2021–50



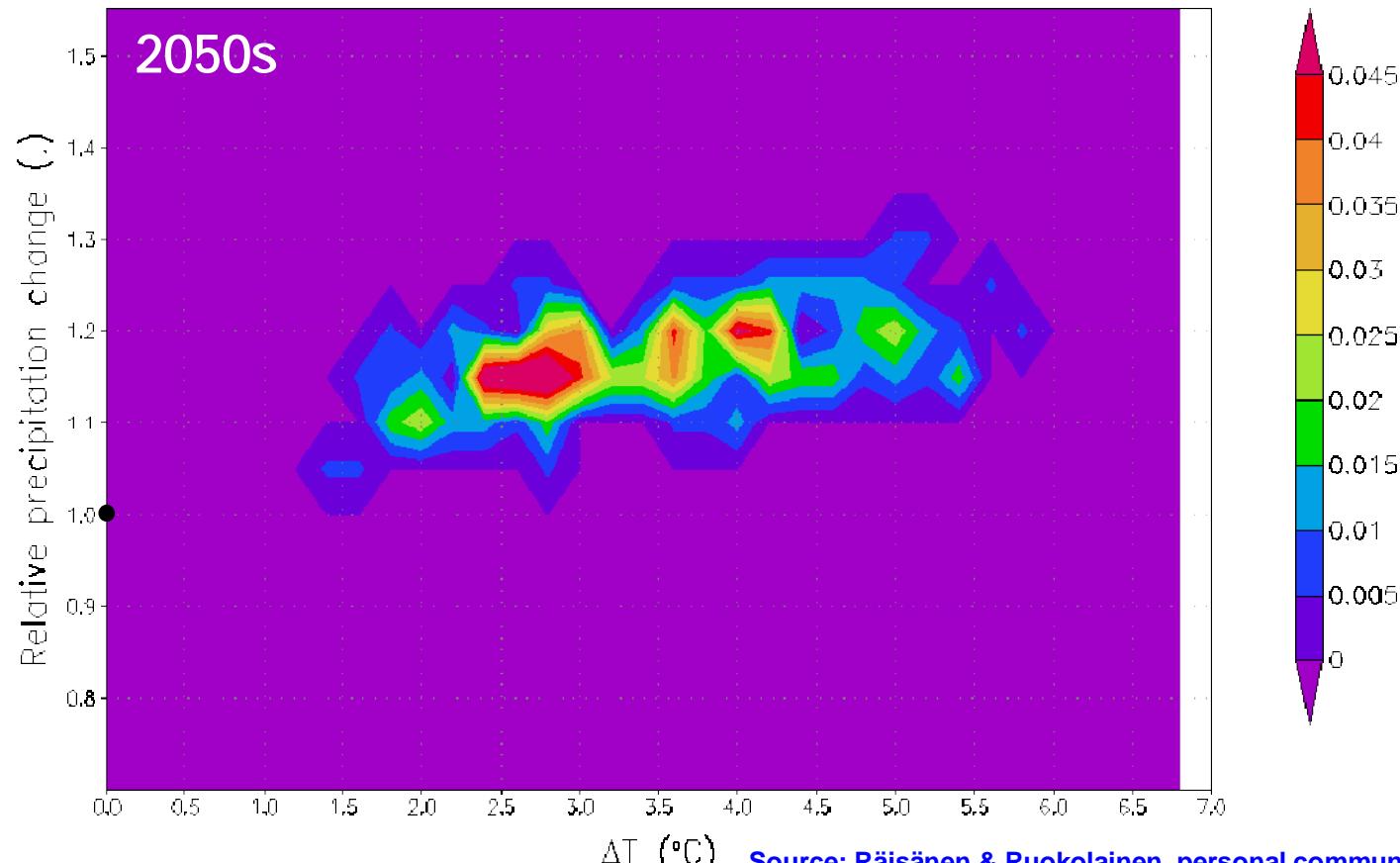
Joint probabilities of 30-year mean changes in mean annual temperature ($^{\circ}\text{C}$) and precipitation (proportion) relative to 1961-1990 for Finland based on an ensemble of AR4 AOGCM simulations assuming A1B emissions

2031–60



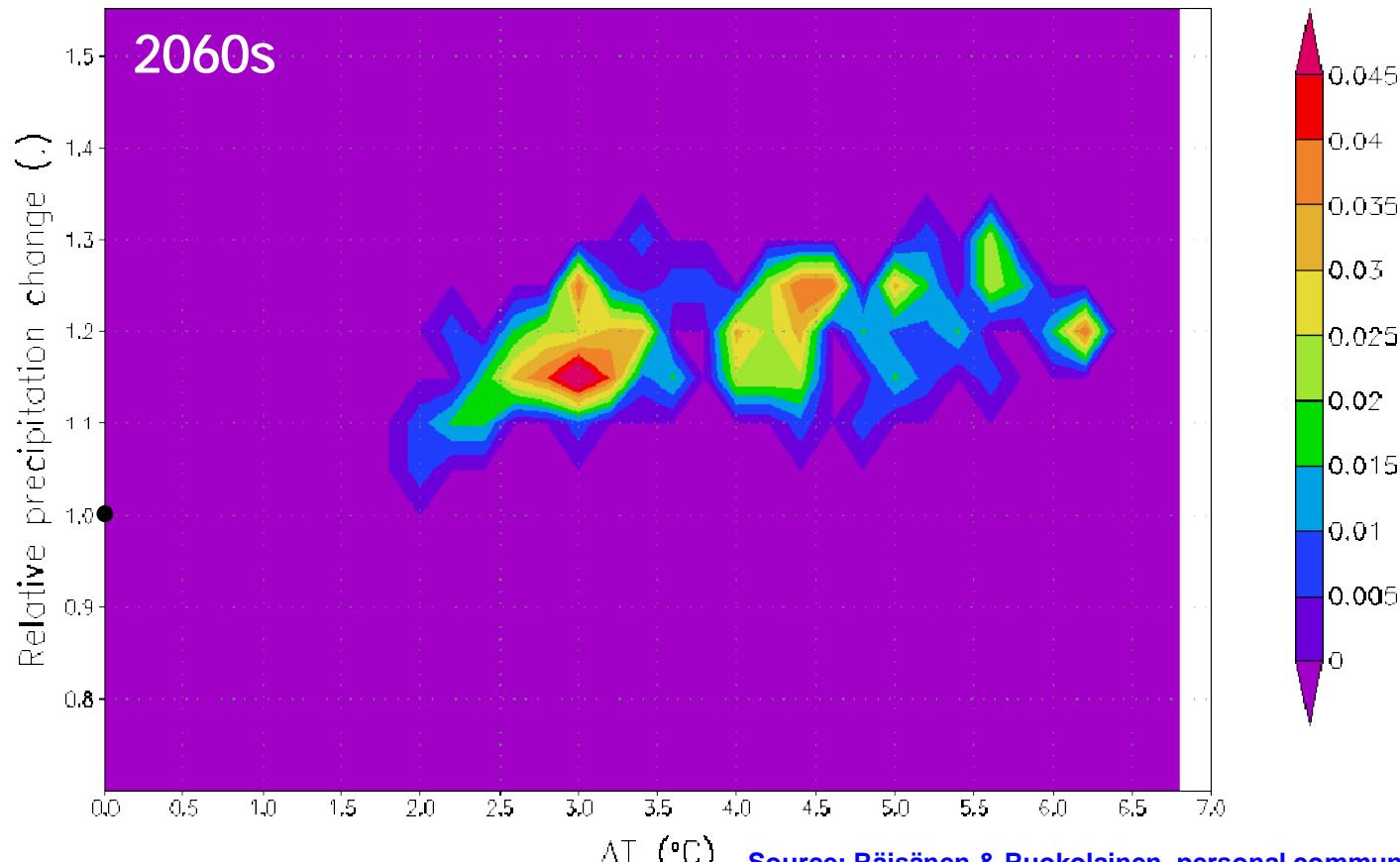
Joint probabilities of 30-year mean changes in mean annual temperature ($^{\circ}\text{C}$) and precipitation (proportion) relative to 1961-1990 for Finland based on an ensemble of AR4 AOGCM simulations assuming A1B emissions

2041-70



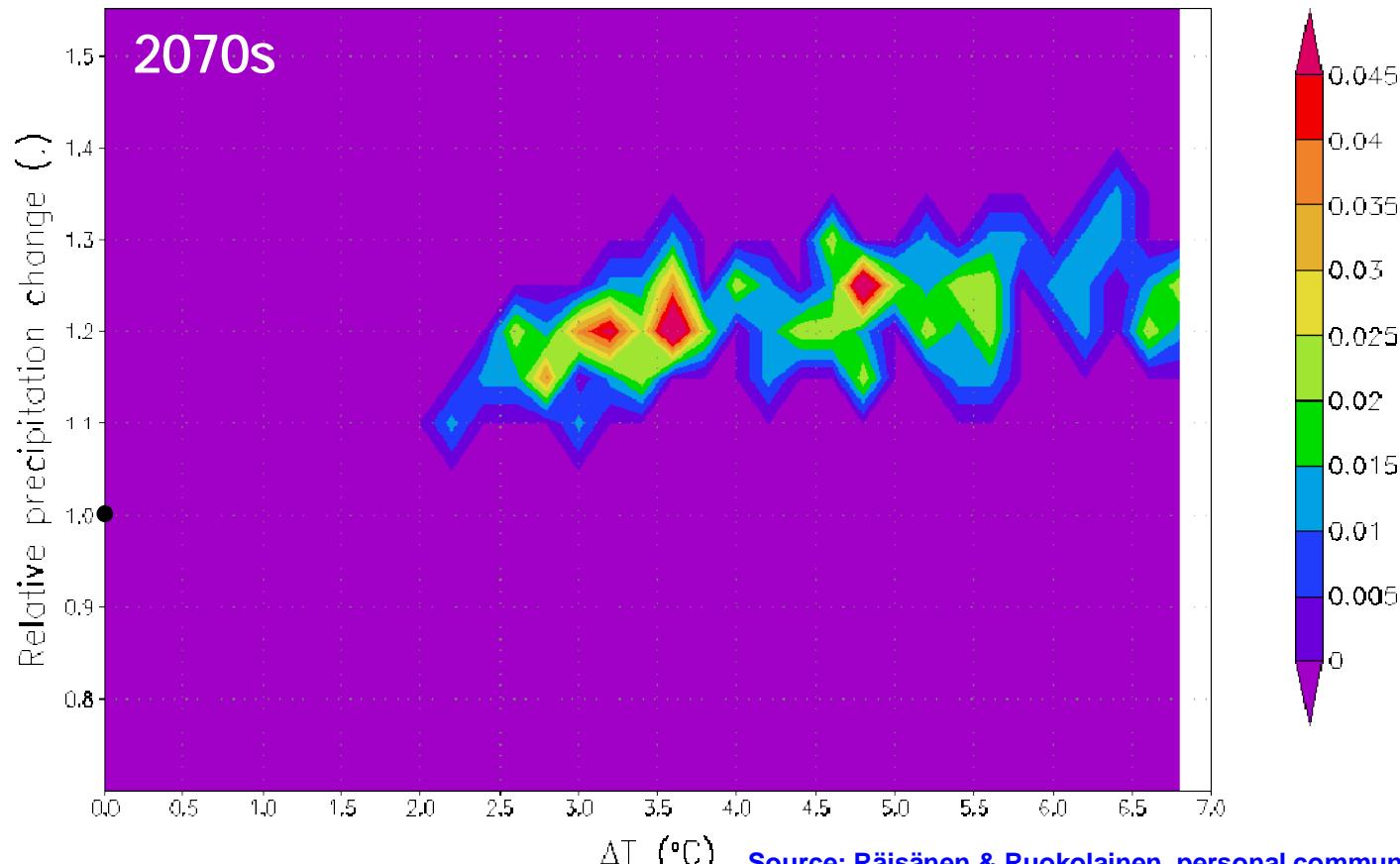
Joint probabilities of 30-year mean changes in mean annual temperature ($^{\circ}\text{C}$) and precipitation (proportion) relative to 1961-1990 for Finland based on an ensemble of AR4 AOGCM simulations assuming A1B emissions

2051-80



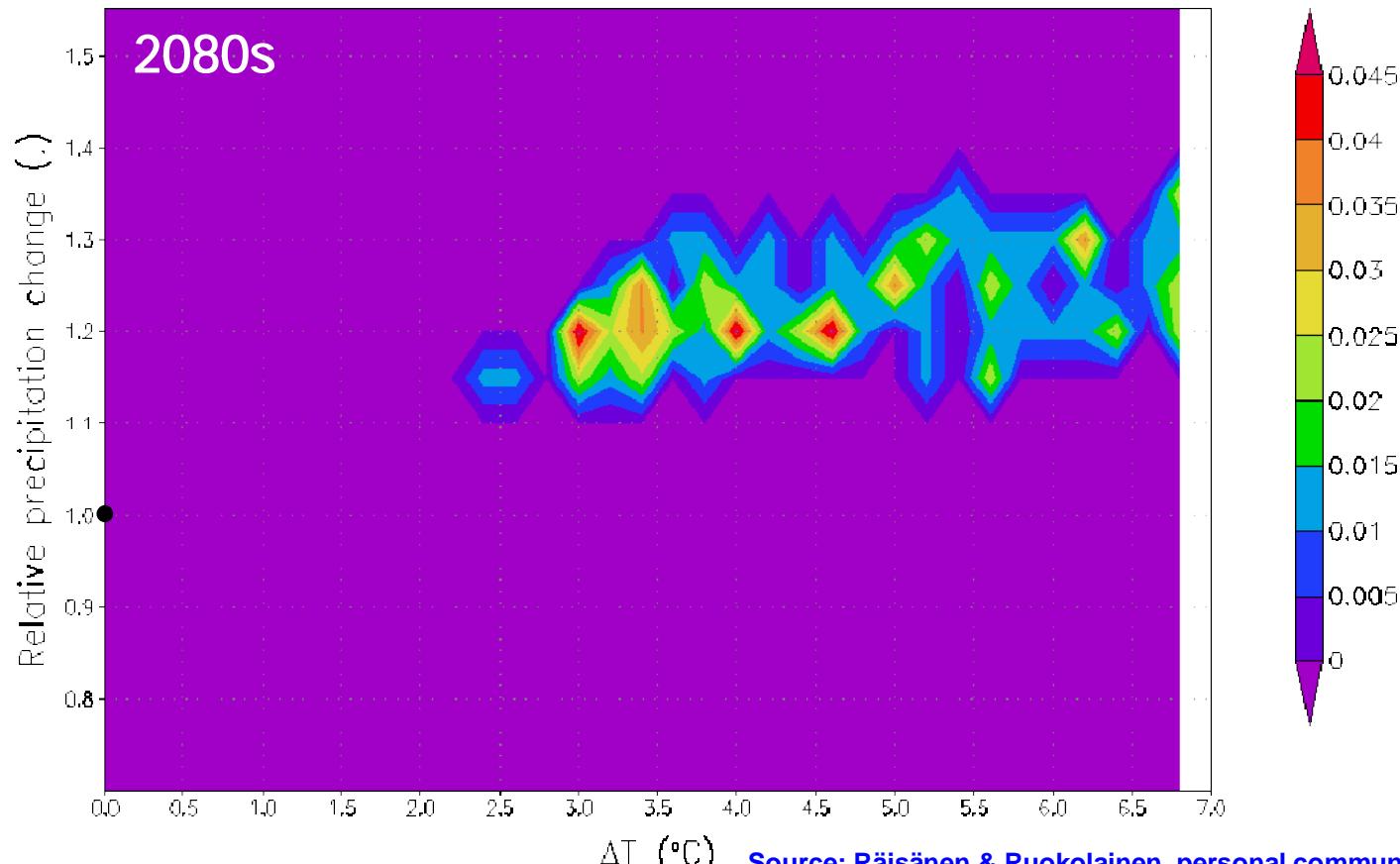
Joint probabilities of 30-year mean changes in mean annual temperature ($^{\circ}\text{C}$) and precipitation (proportion) relative to 1961-1990 for Finland based on an ensemble of AR4 AOGCM simulations assuming A1B emissions

2061–90



Joint probabilities of 30-year mean changes in mean annual temperature ($^{\circ}\text{C}$) and precipitation (proportion) relative to 1961-1990 for Finland based on an ensemble of AR4 AOGCM simulations assuming A1B emissions

2071-98



A possible global framework for undertaking regional downscaling

Making sense of global model ensembles

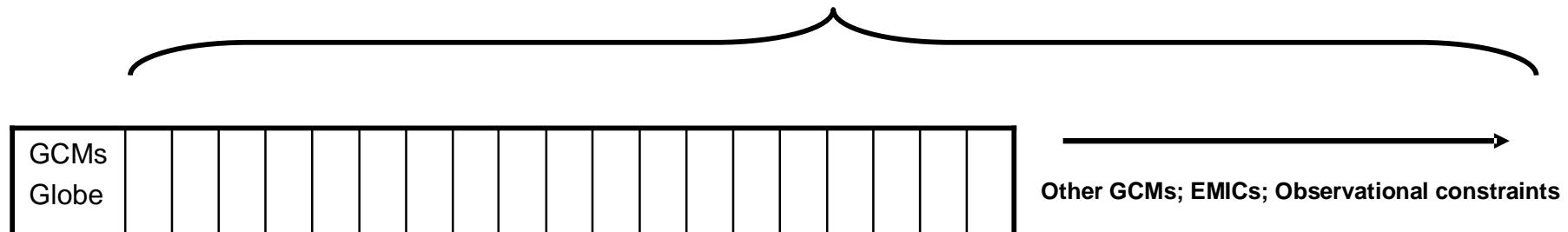
Global model uncertainties



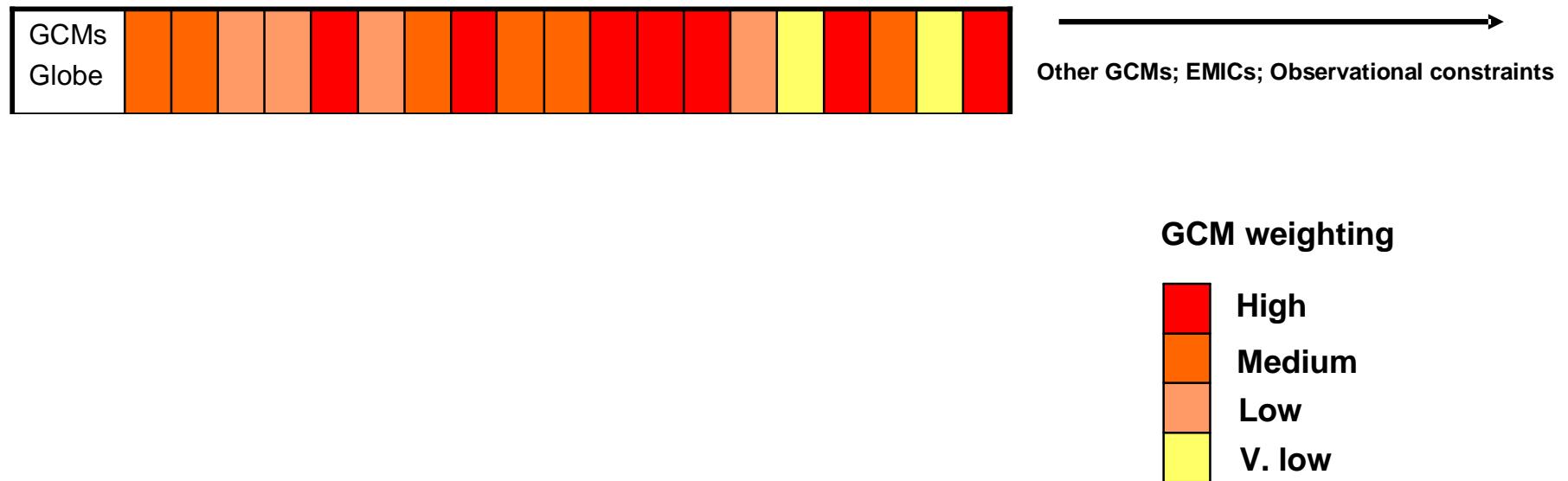
GCMs																
Globe																

Making sense of global model ensembles

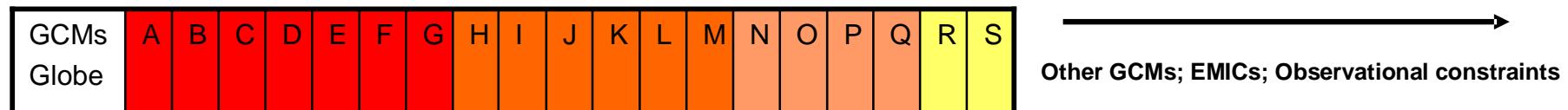
Global model uncertainties



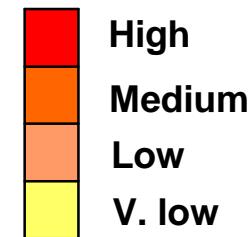
Performance weighting of global models



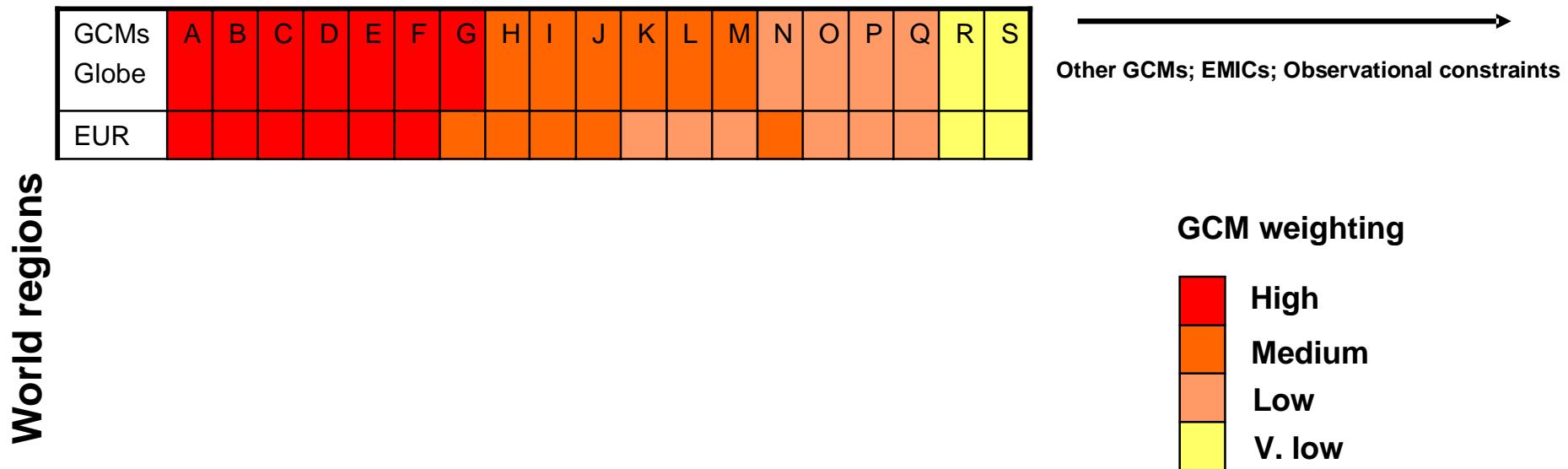
Ranking of global model weights



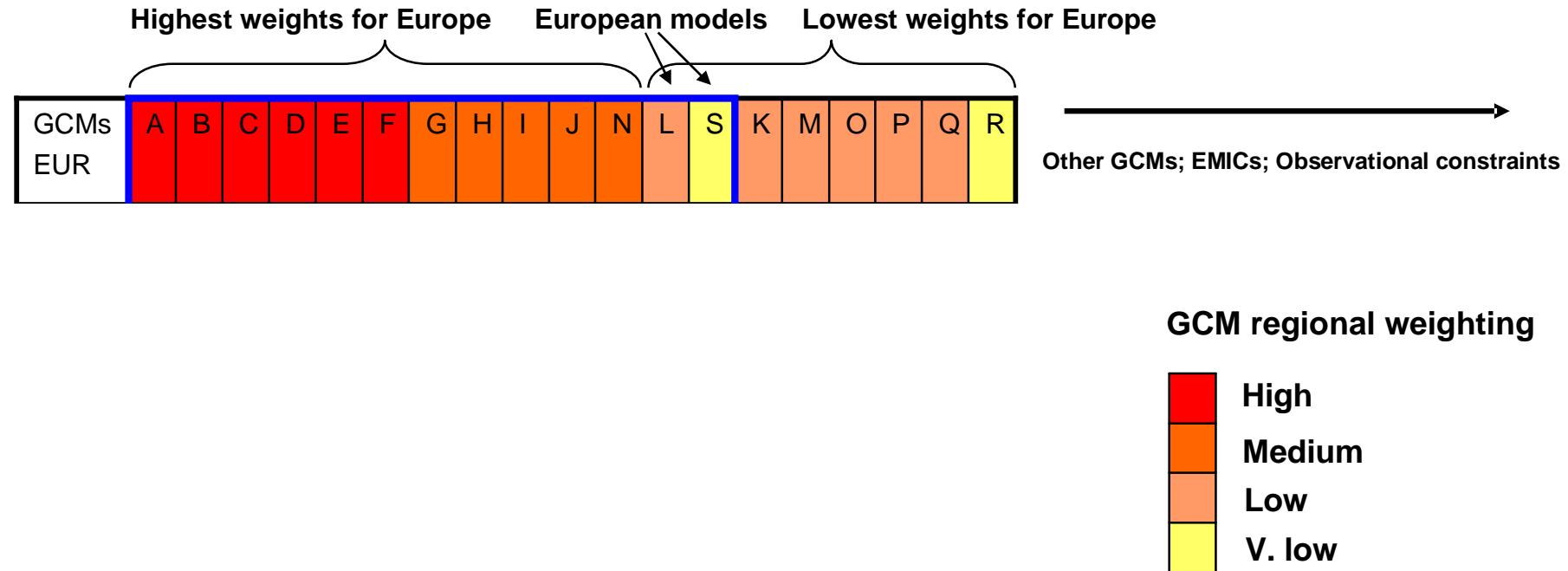
GCM weighting



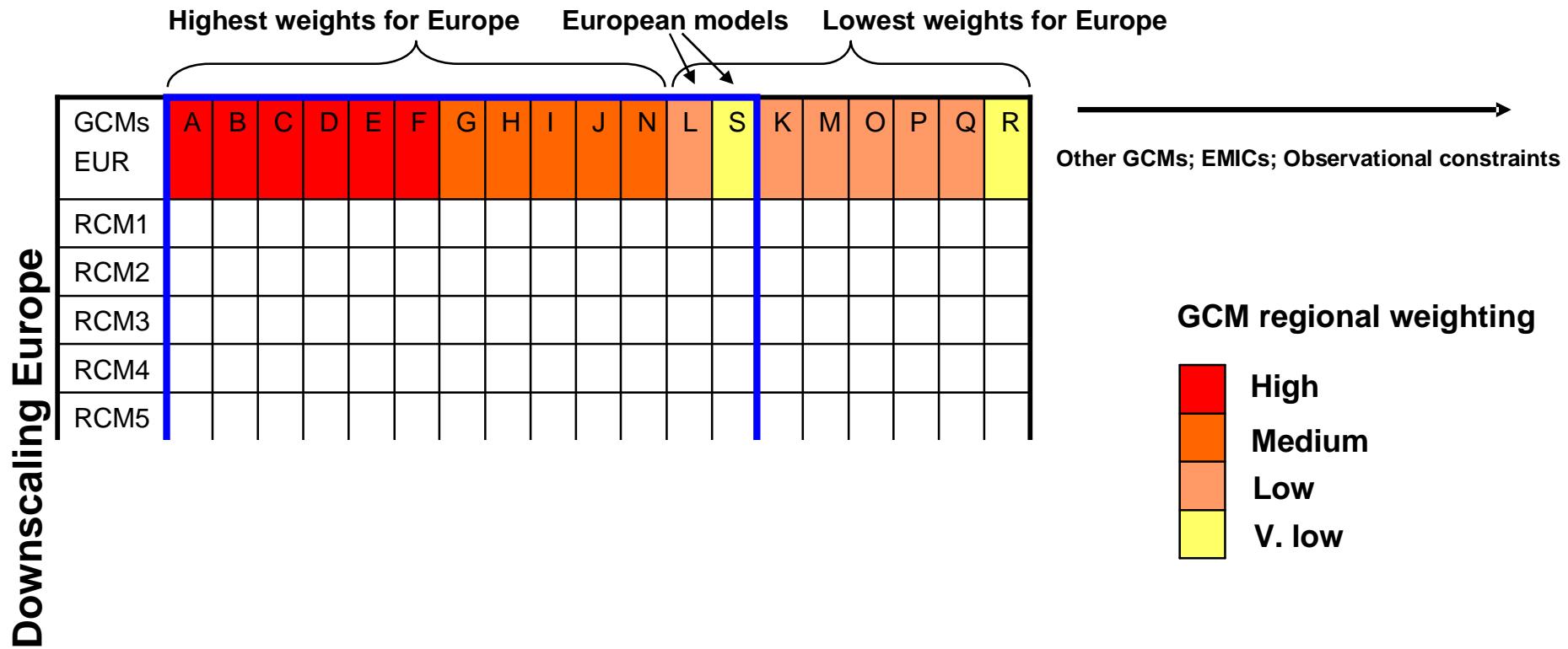
Ranking of global model weights and regional weighting



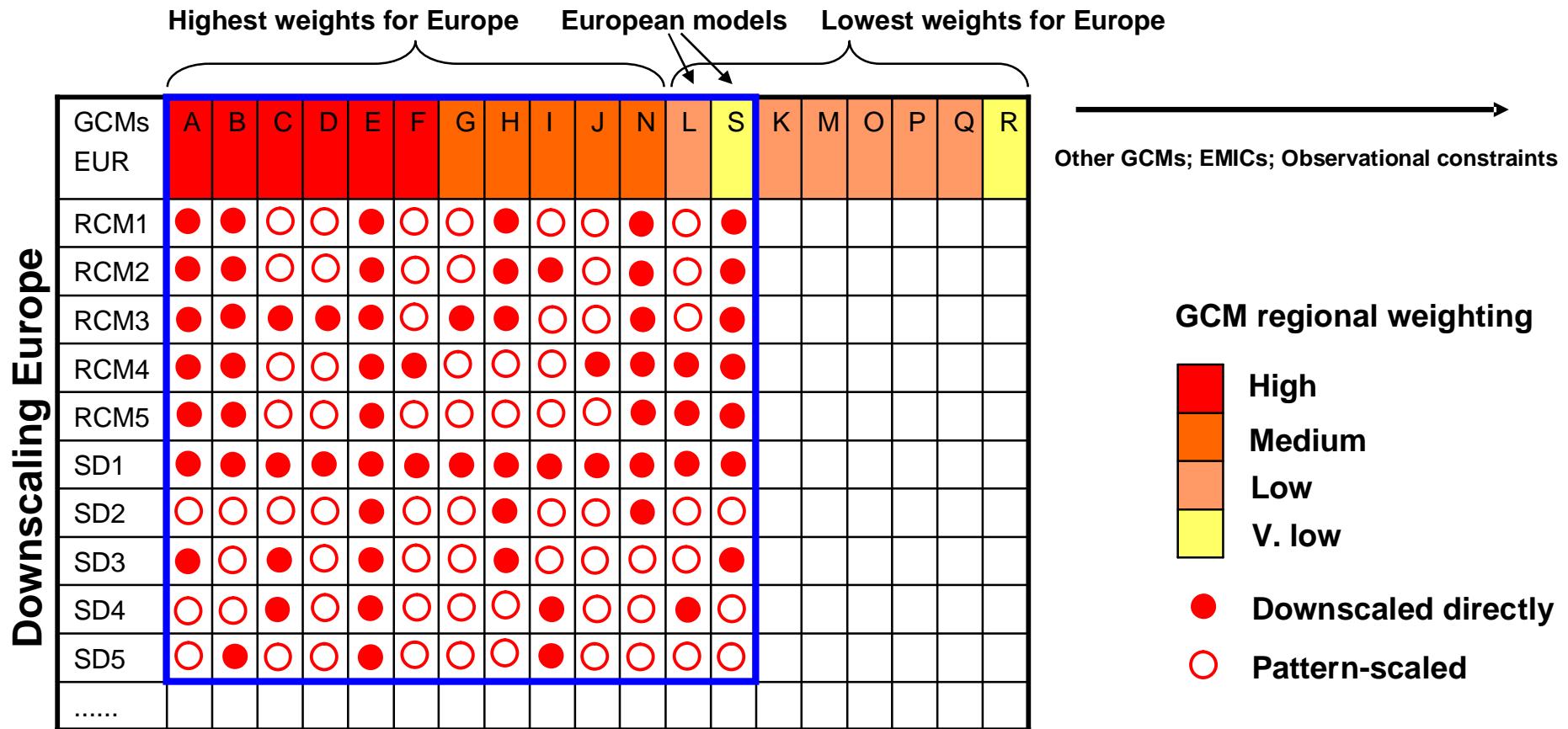
Regional downscaling matrix for ranked GCM ensemble with pattern-scaling: Europe (hypothetical)



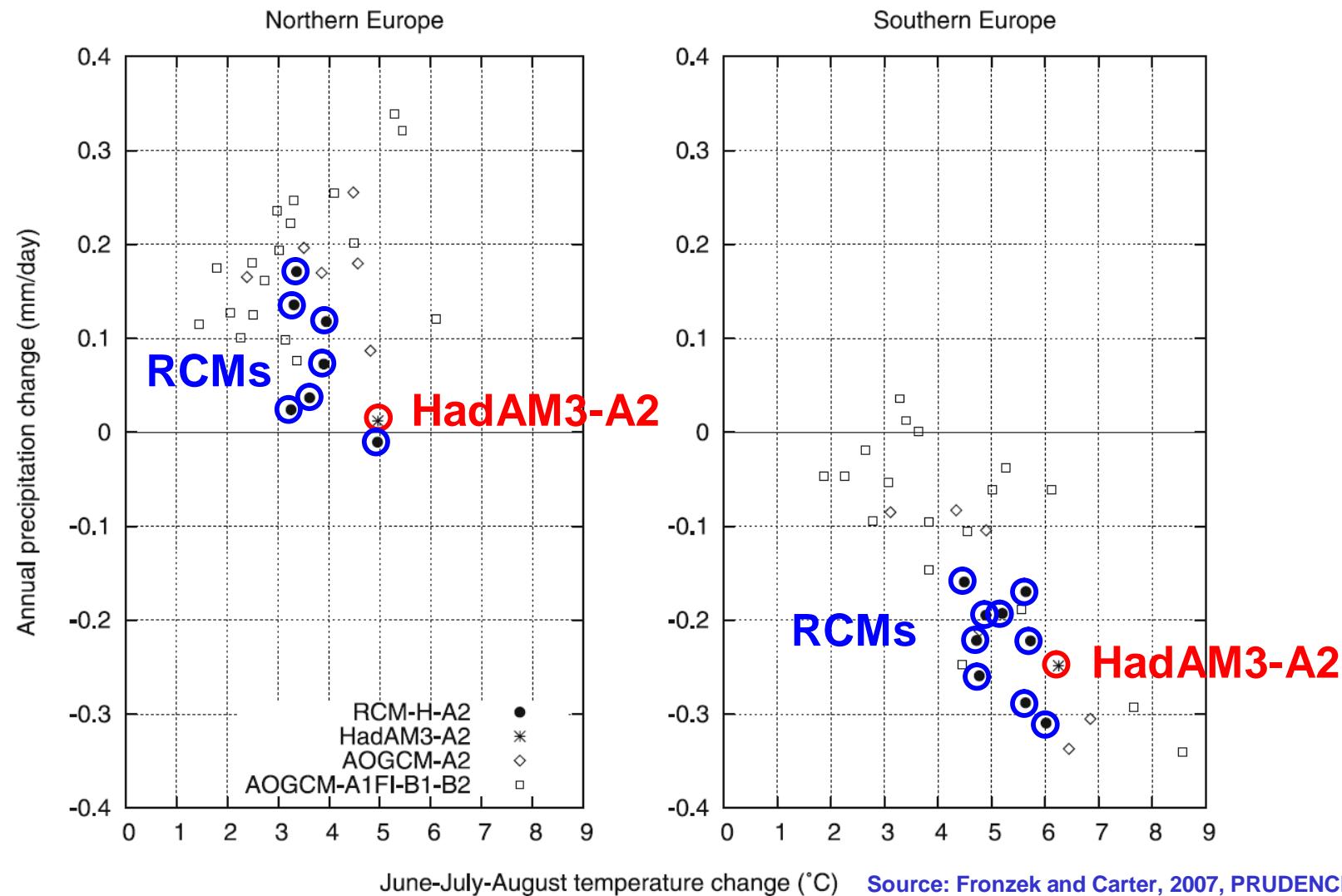
Regional downscaling matrix for ranked GCM ensemble with pattern-scaling: Europe (hypothetical)



Regional downscaling matrix for ranked GCM ensemble with pattern-scaling: Europe (hypothetical)



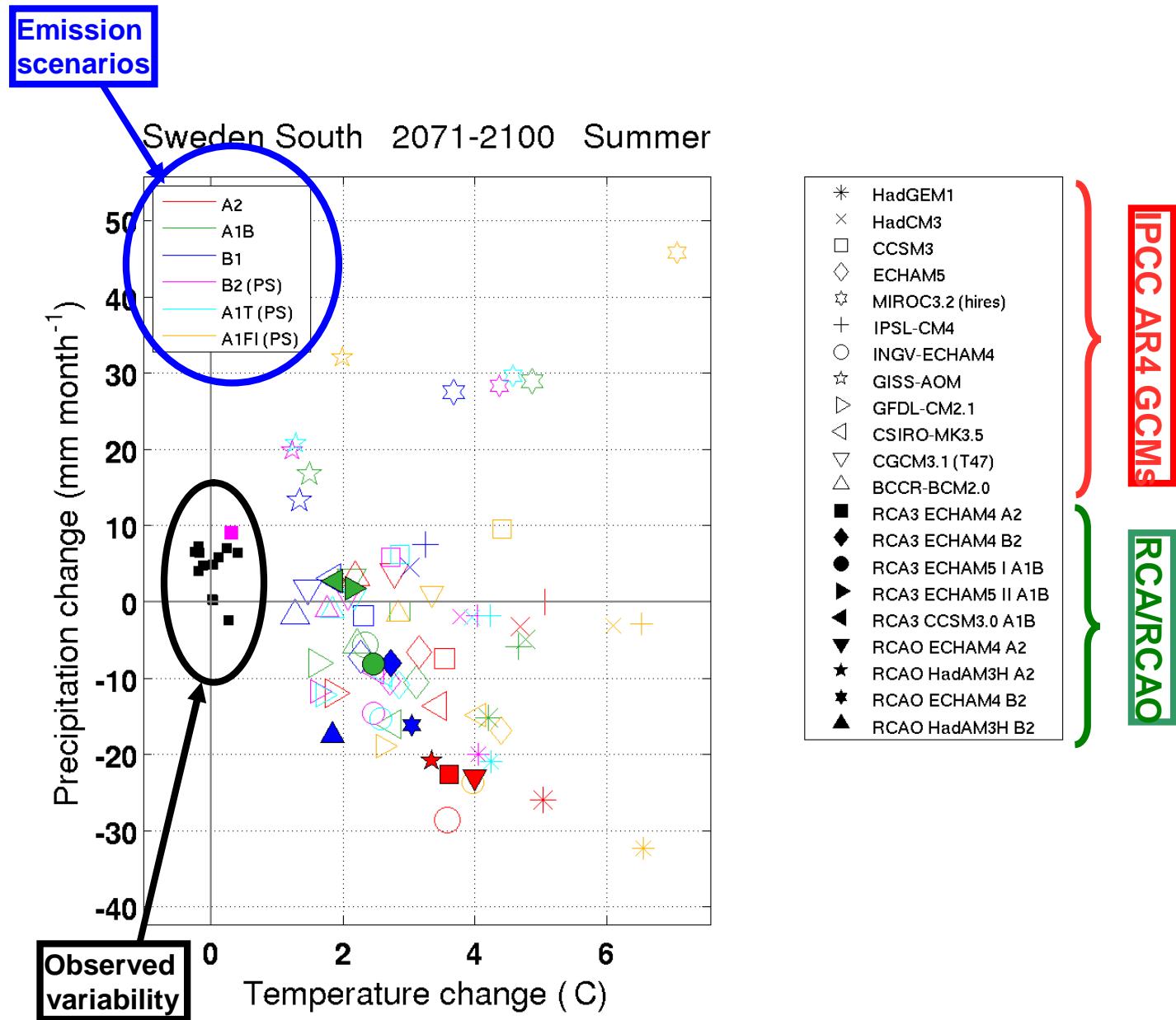
Comparing RCM and GCM uncertainties



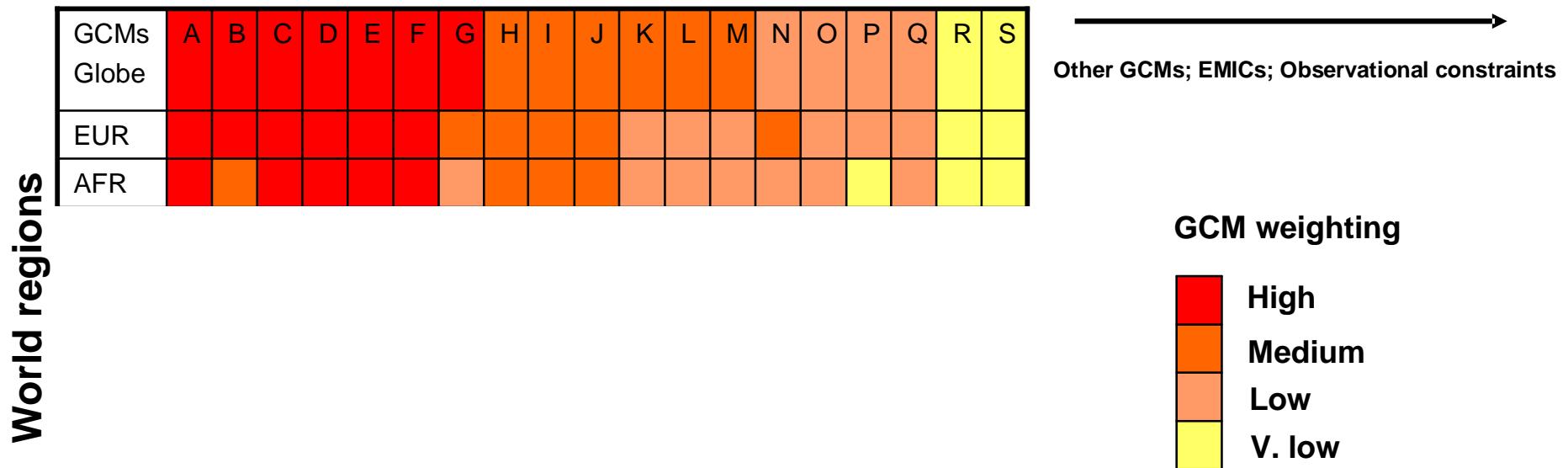
Source: Fronzek and Carter, 2007, PRUDENCE



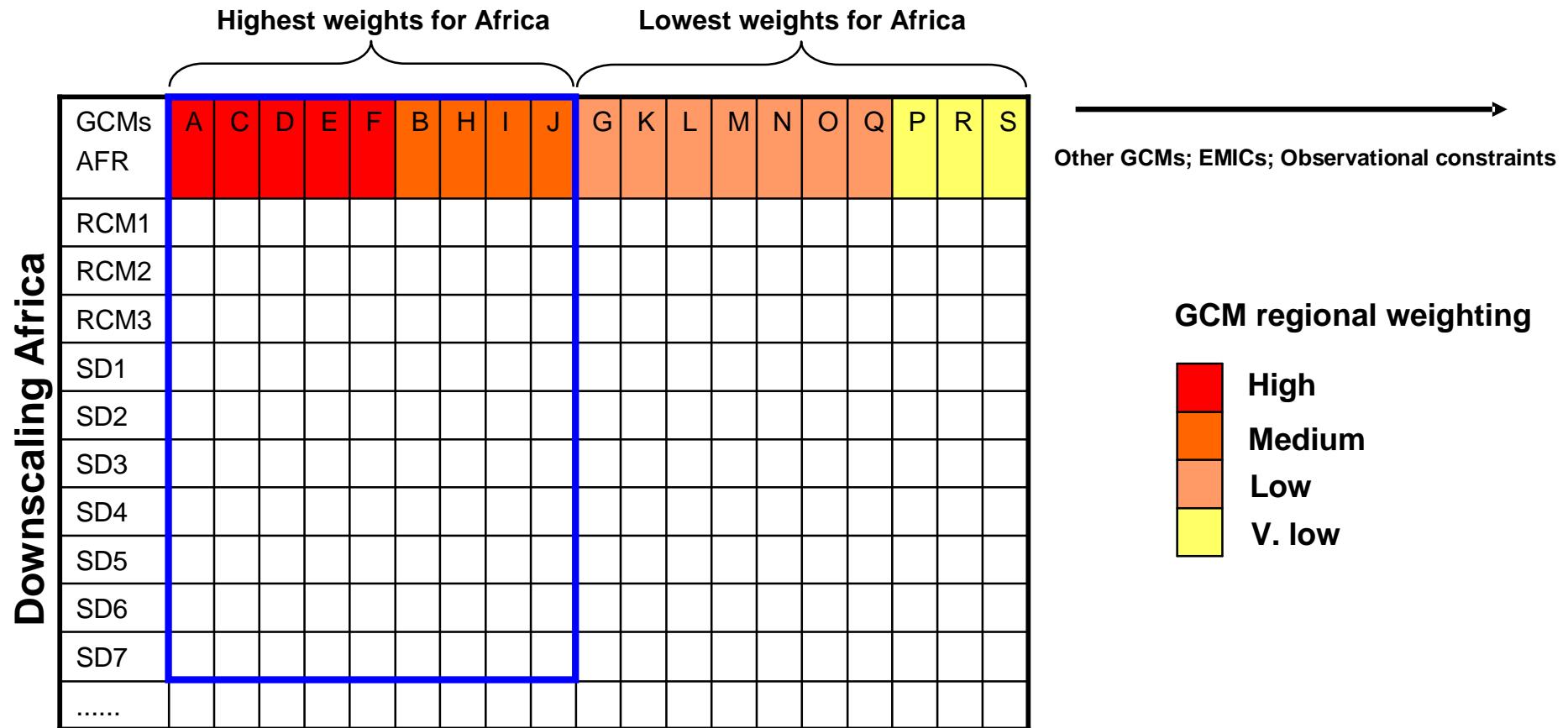
Dealing with uncertainty...



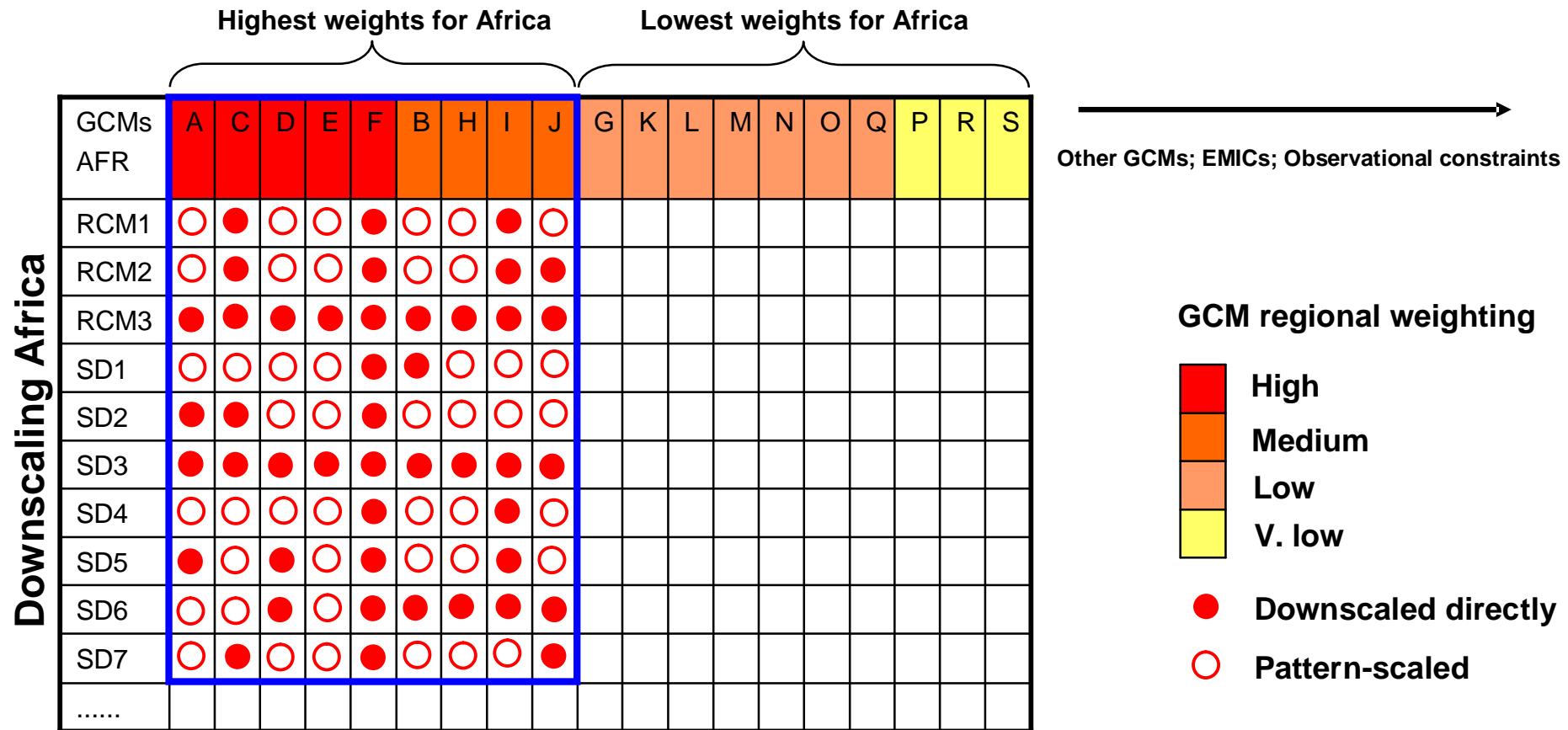
Ranking of global model weights and regional weighting



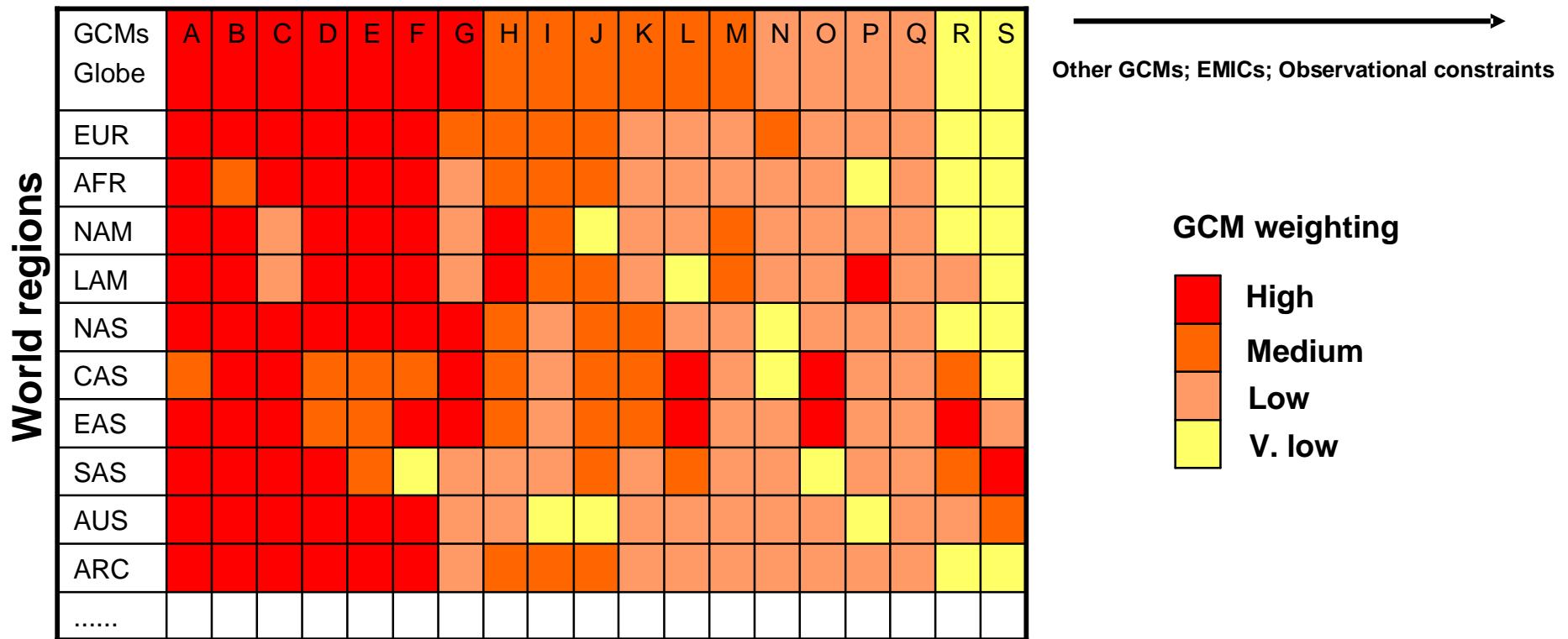
Regional downscaling matrix for ranked GCM ensemble with pattern-scaling: Africa (hypothetical)



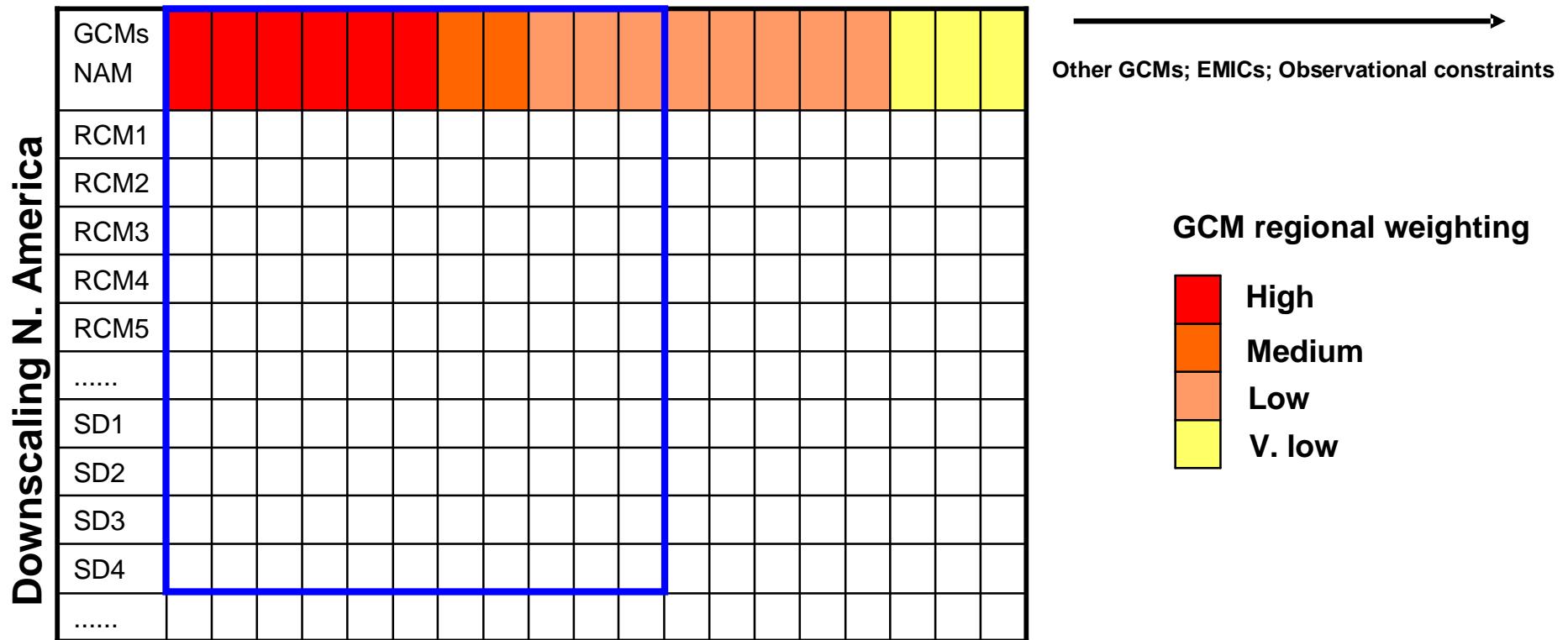
Regional downscaling matrix for ranked GCM ensemble with pattern-scaling: Africa (hypothetical)



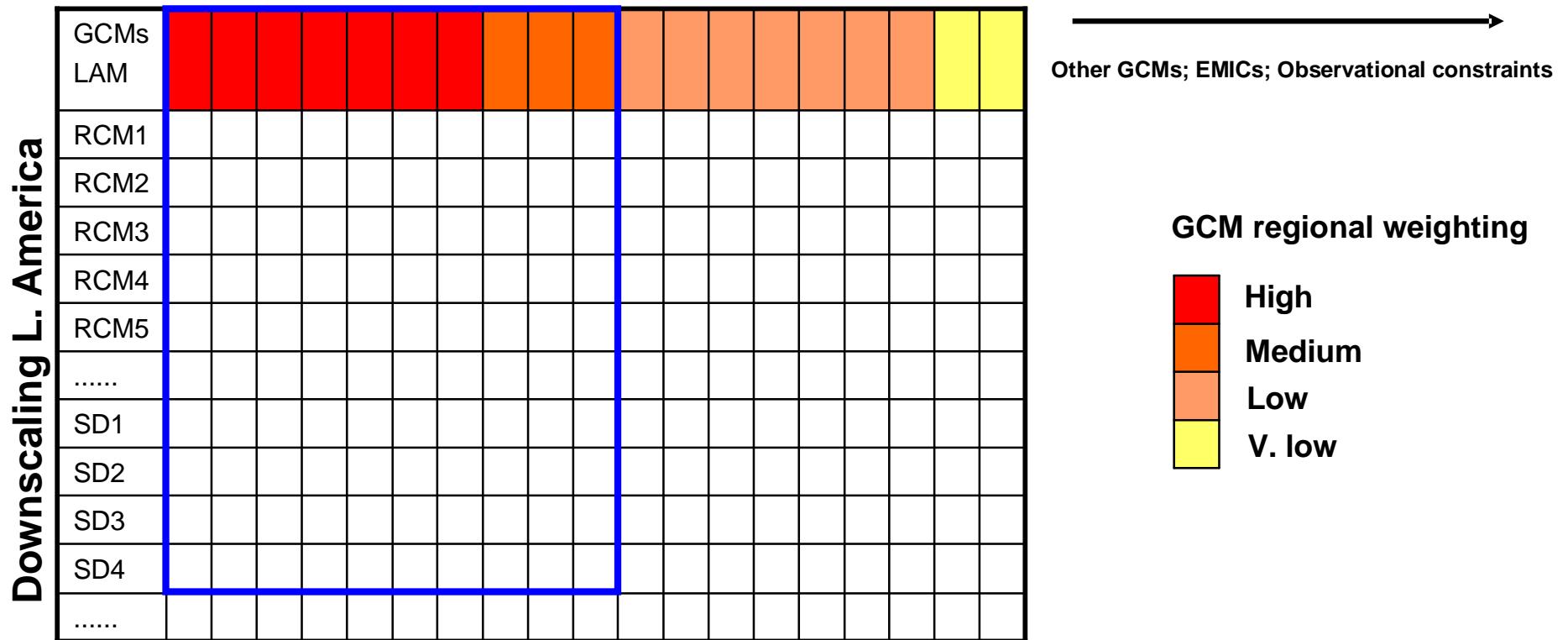
Ranking of global model weights and regional weighting



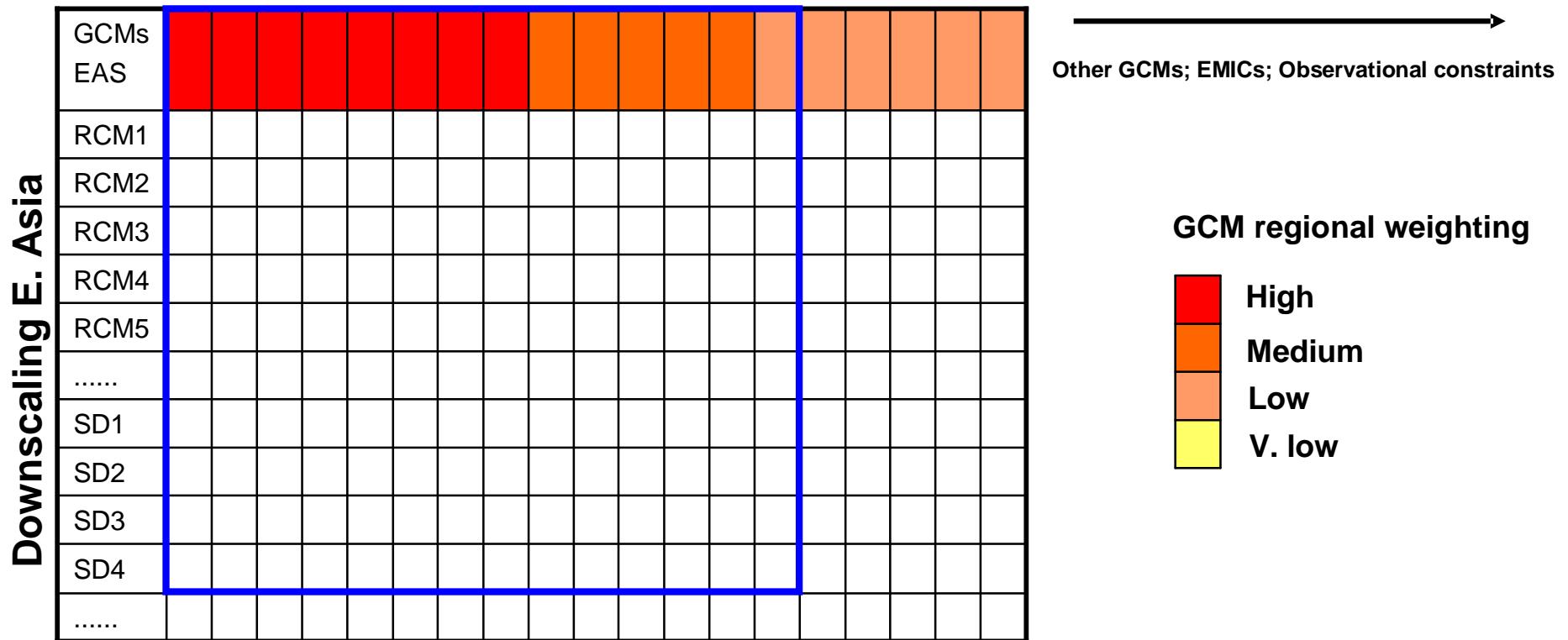
Regional downscaling matrix for ranked GCM ensemble with pattern-scaling: N. America (hypothetical)



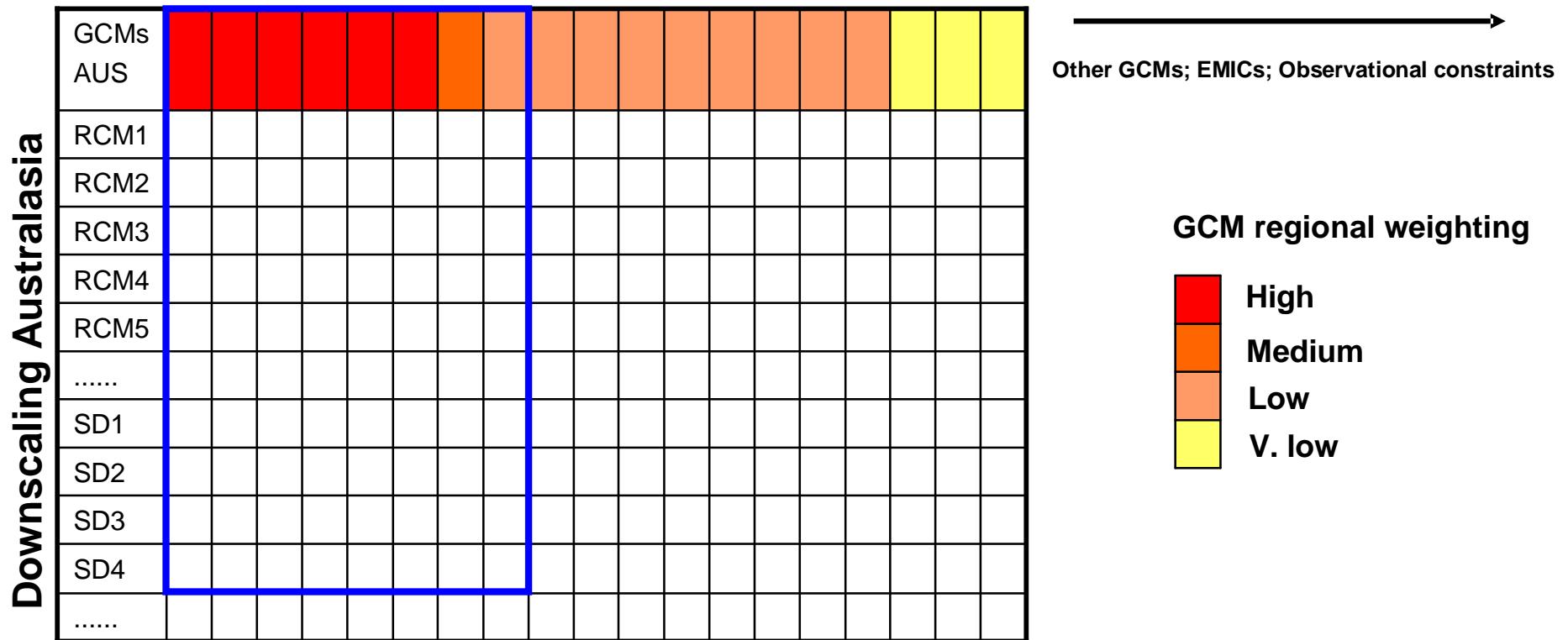
Regional downscaling matrix for ranked GCM ensemble with pattern-scaling: L. America (hypothetical)



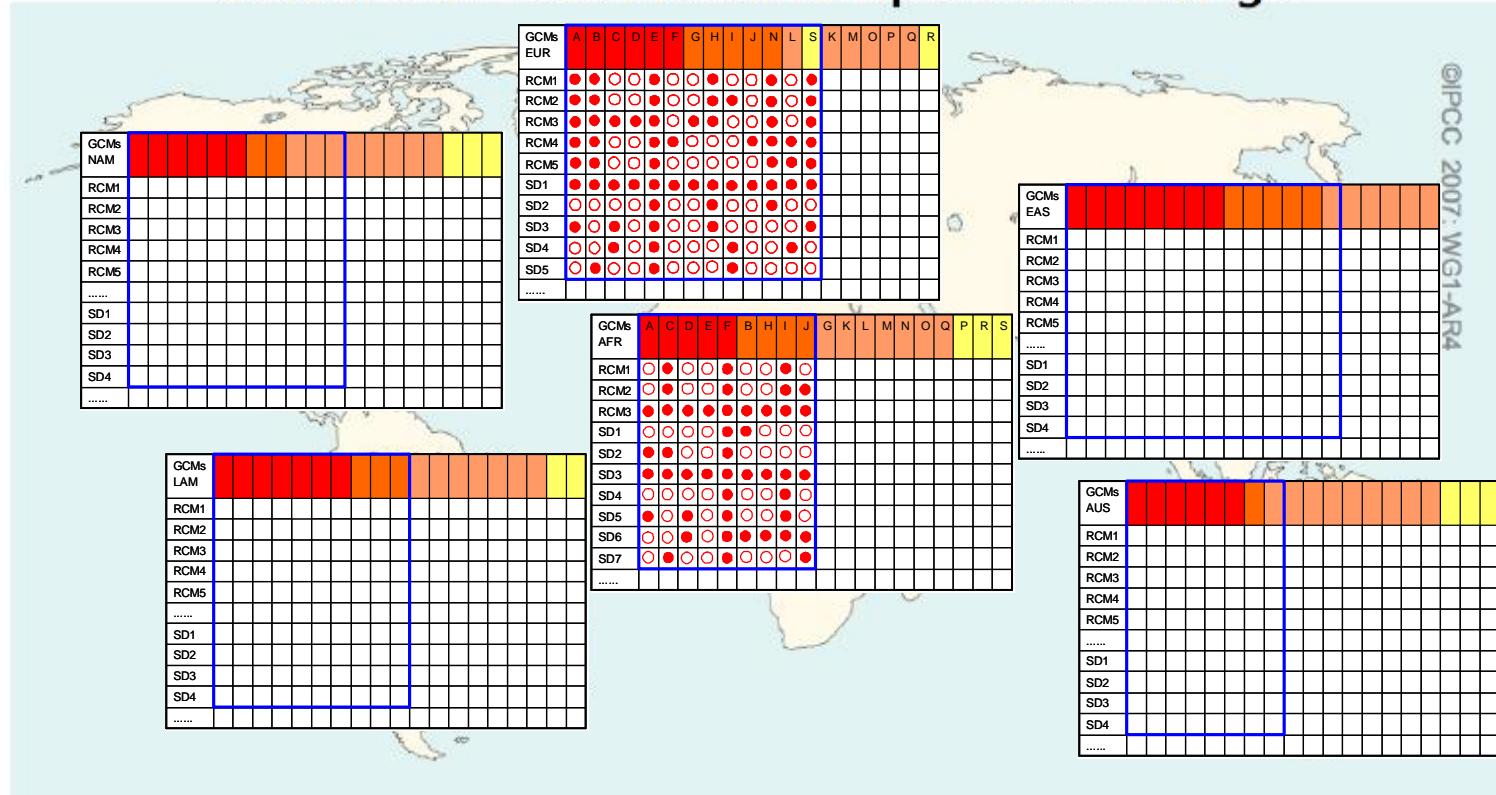
Regional downscaling matrix for ranked GCM ensemble with pattern-scaling: E. Asia (hypothetical)



Regional downscaling matrix for ranked GCM ensemble with pattern-scaling: Australasia (hypothetical)



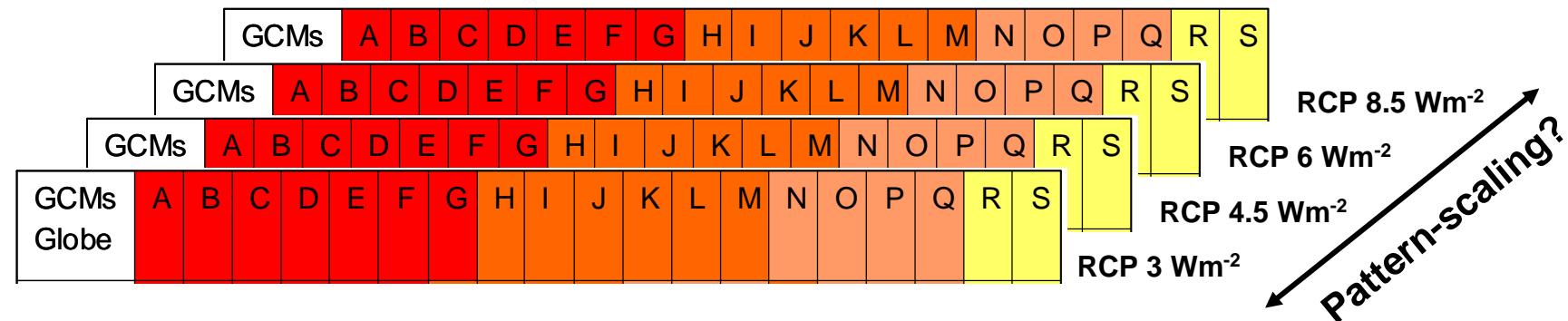
Global and Continental Temperature Change



Number and extent of regions would need to be determined

Global models serving as drivers for downscaling and context for regional projections

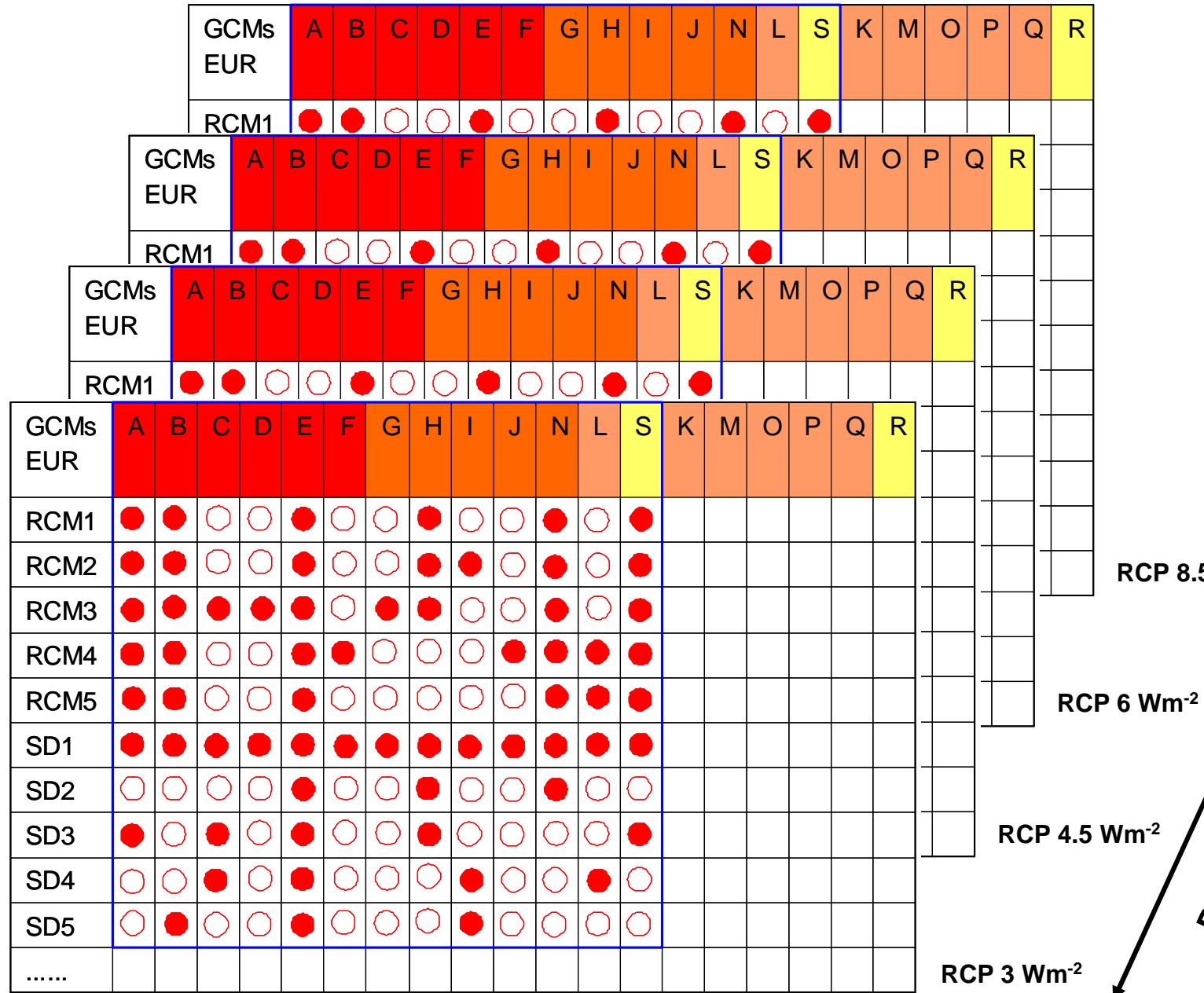
AR5 global model simulations for representative concentration pathways



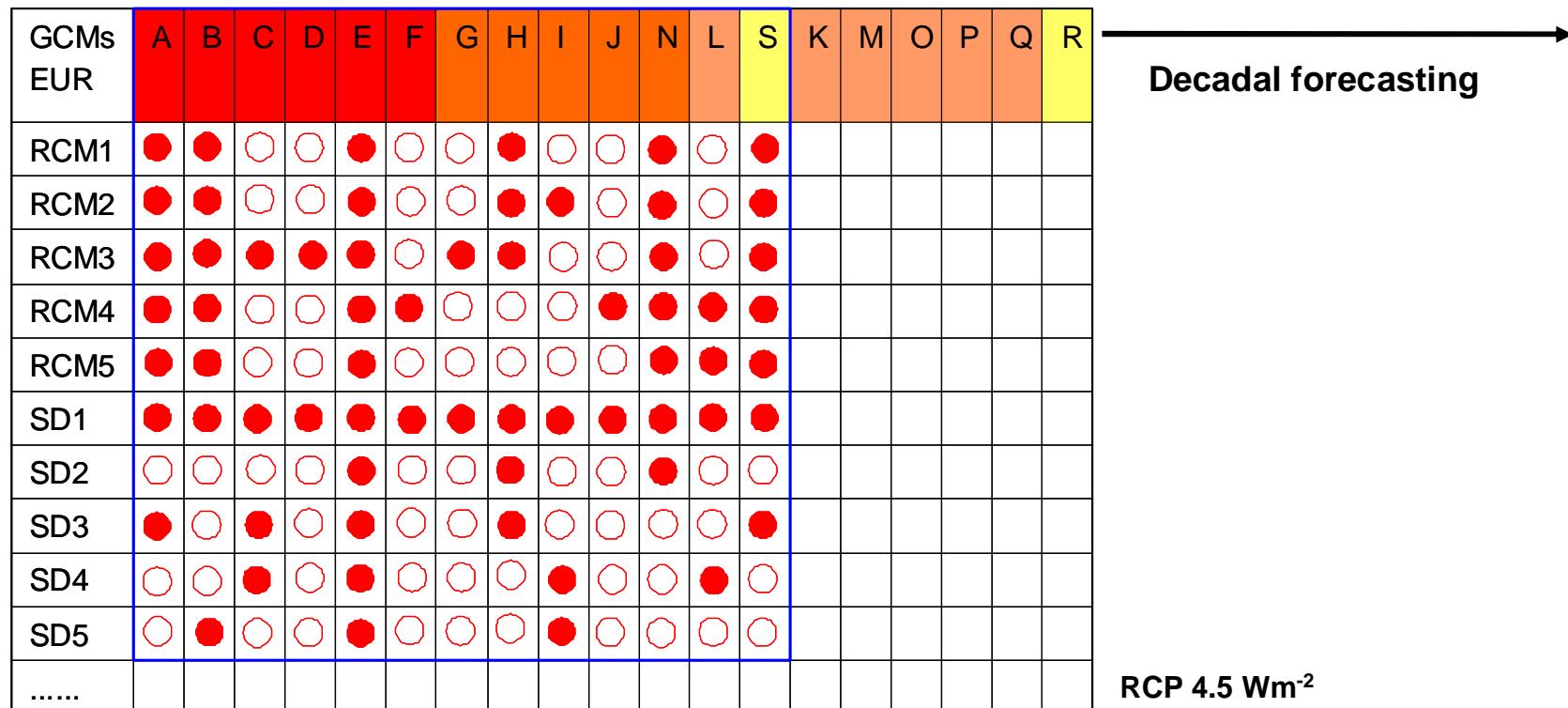
Scenario	CO ₂ eq ppm / 2100
RCP 2.6	490? PD
SRES B1	600
RCP 4.5	650
SRES A1T	700
SRES B2	800
SRES A1B	850
RCP 6	850
SRES A2	1250
RCP 8.5	1370
SRES A1FI	1550

GCM weighting



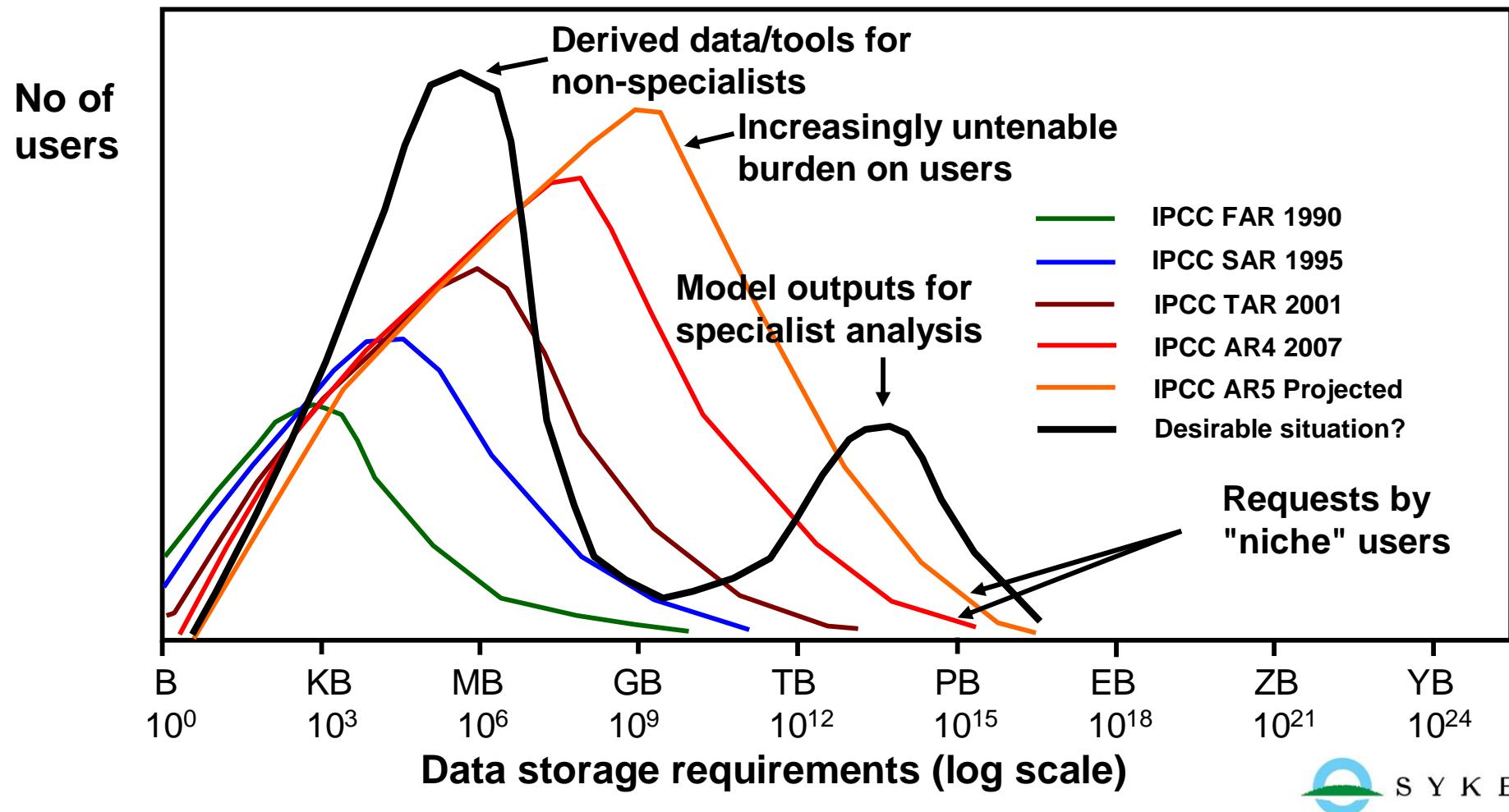


Regional downscaling matrix for near-term projections to 2035 plus decadal forecasts



Implications of the new AR5 scenarios process for data handling, interpretation and application

Storage requirement for archiving IPCC-related model projections vs. number of users accessing data (schematic)



Conclusions

- § There is already considerable "bottom-up" activity providing climate information to support adaptation decisions
 - National web portals
 - Analytical tools for processing climate information
 - Observational datasets
- § These initiatives should be evaluated by the IPCC
- § The large volume of climate data anticipated from the AR5 scenario process demands creative approaches to data analysis and delivery (e.g. using probabilistic methods)
- § A programme of systematic downscaling from global model outputs in different world regions will add to the volume of data, but:
 - would provide fine resolution data to regions hitherto deprived, including many of the most vulnerable
 - can offer new information on extreme weather events
 - presents a regional focus of direct relevance to regional scientists and policy makers

Notice

Colleagues are welcome to incorporate these slides into their own presentations, assuming they are correctly acknowledged. However, the author would also appreciate being informed prior to the extensive use of this material in public meetings.