UNFCCC in-session workshop on climate modelling, scenarios and downscaling under the NWP on impacts
Bonn, Germany
10:00–13:00, 7 June, 2008

Climate Modelling and downscaling under the Nairobi Workprogramme

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CCST/INPE, Sao Paulo Brazil
Co-chair IPCC TGICA
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CSAG, University of Cape Town, South Africa
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weADAPT group, Stockholm Environment Institute, Sweden

Potential contributions of IPCC TGICA and IPCC DDC

The IPCC TGICA has its mandate to facilitate wide availability of climate change-related data and scenarios to enable research and the sharing of information across the three working groups of the IPCC.

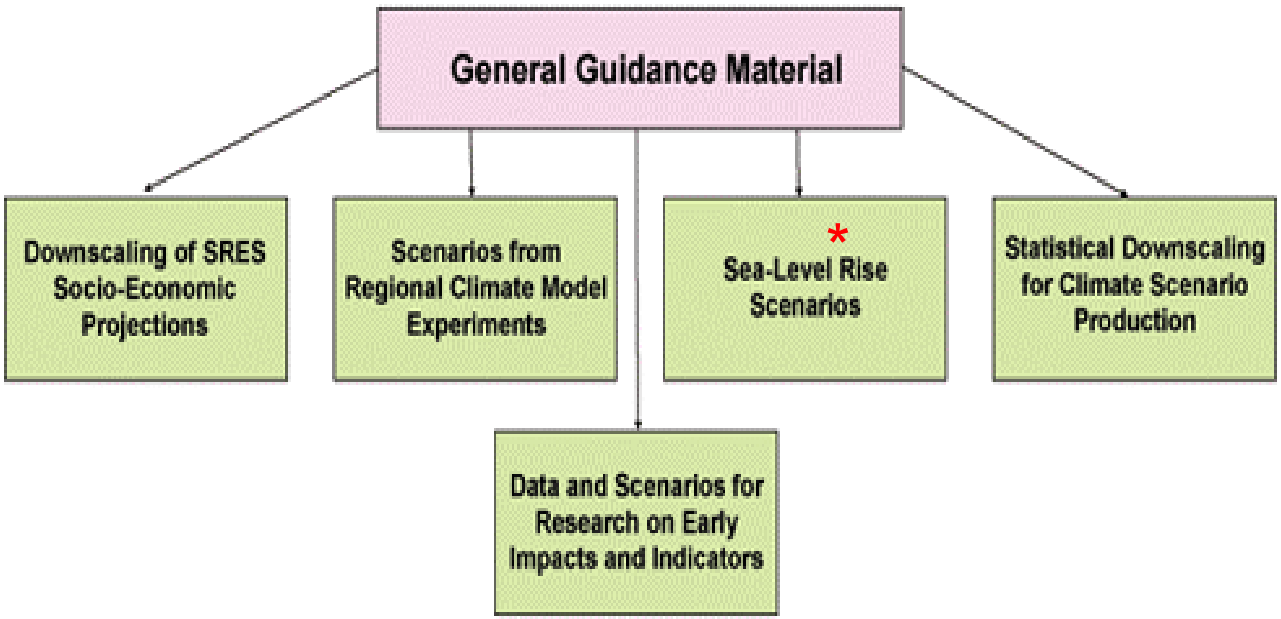
The TGICA established the IPCC Data Distribution Centre (DDC) in 1998 to facilitate the timely distribution of a consistent set of up-to-date data and scenarios of changes in climate and related environmental and socio-economic factors for use in climate change impact, adaptation and vulnerability (IAV) studies.

IPCC products for the NWP: Climate modelling, scenarios and downscaling; a comprehensive archive of variables which are relevant to impact and adaptation work from IPCC climate change projections is maintained; user support. to ensure proper use of data.

The three DDC centres, BADC (UK), DKRZ (Germany) and CIESIN (USA) have a wide range of expert knowledge.

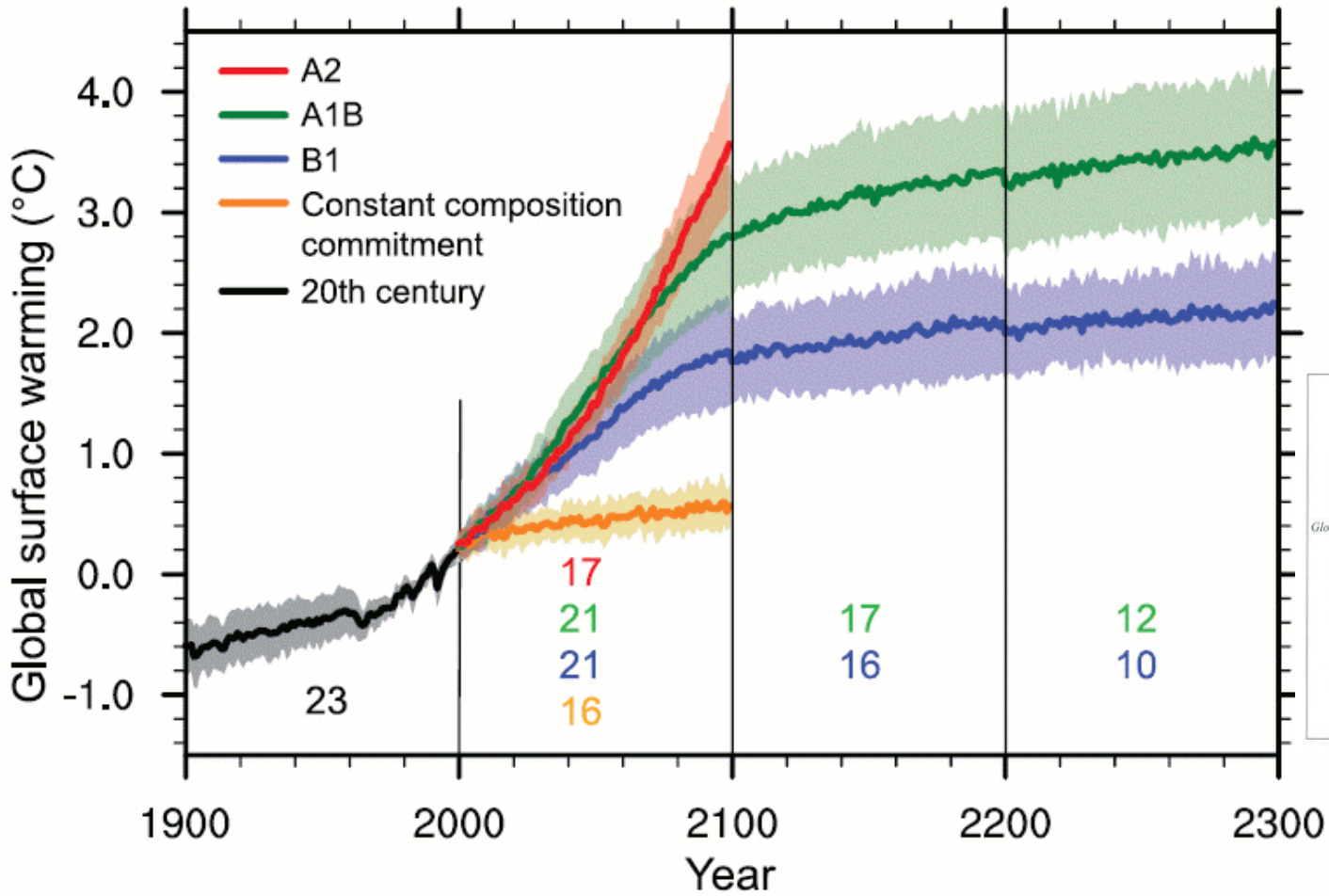
Technical Guidelines and other Supporting Material

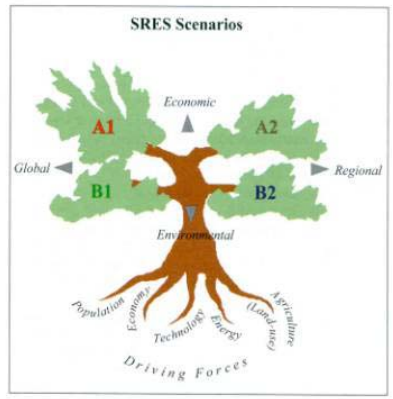
There are also a number of documents providing detailed guidelines on specific issues relating to the application of data and scenarios held on the DDC and elsewhere for use in vulnerability, impacts and adaptation assessments (see schematic diagram). Some documents are under preparation. Other documents on new themes will be added in the future.



The TGICA disseminates information in support of IPCC work, as well as IPCC "approved", "adopted," "accepted," and "supporting" material.

Climate Model Data at the IPCC DDC





WG1 Global Climate Projections Figure 10.4

Multi-model means of surface warming relative to 1980-1999

IPCC AR4 Data on DVD

UNEP

IPCC-DDC: SRES-AR4 GCM data - Mozilla Firefox

Edit View History Bookmarks Tools Help

http://www.mad.zmaw.de/IPCC_DDC/html/SRES_AR4/inde:

TGICA

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INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

The IPCC Data Distribution Centre

WMO UNEP

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servations
dels: Summary data
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AR4 GCM data

Location: DDC Home GCM Experiment Data SRES-AR4

To obtain data choose a centre and an scenario there. Then decide which variables you need will be guided to the database interface which

AR4 (2007): SRES scenarios
TAR (2001): SRES scenarios
SAR (1995): IS92 scenarios

These data represent a subset of the IPCC-Mode Ouput archive run by PCMDI. There you may also find the complete set of variables in monthly, daily or 3 hourly temporal resolution.

The data formats available are GRIB (machine independent, selfdescriptive binary form WMO standard) and GZIP (compressed ASCII format). Information on both formats and internal data structure is given here.

Order Data on DVD
You can get the IPCC AR4 DVD's here

Search the DDC: go
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Latest News
New guidance materials available. More...
(23/04/2003)

License Statement

These data are licensed for use in Research Projects only. A 'Research Project' is any project organised by a university, a scientific institute, o similar organisation (private or public), for non-commercial research purposes only. A necessary condition of the recognition of non-commercial purposes is that all the results obtained are openly available at delivery costs only, without any delay linked to commercia objectives, and that the research itself is submitted for open publicatio

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Please take note of the acknowledgement information below !

Survey of available SRES Scenarion Runs for AR4

Status of data : August 2006
For correction and replacement of data sets please look at the erata page of

Pleas note

The IPCC-DDC data archive contains data sets that have beem store Model Output Archive at PCMDI after September 1. 2006 . Thus these have contributed to the results of the IPCC - Fourth Assessment Repo concernes individual data sets or even complete experiments. Experiments that contain data sets which became available from the after 1. September 2006 **and** do not have an intetrnal information about a processing data prior to 1. September 2006 are marked by a blue colored cell box. Please have a look into the **Quality** (meta-data) information for more details.

Center | COM- | 1%- | 1%- | add.

://www.mad.zmaw.de/IPCC_DDC/html/SRES_AR4/index.html

High resolution scenarios developed from regional climate model results have been obtained in various parts of the world.

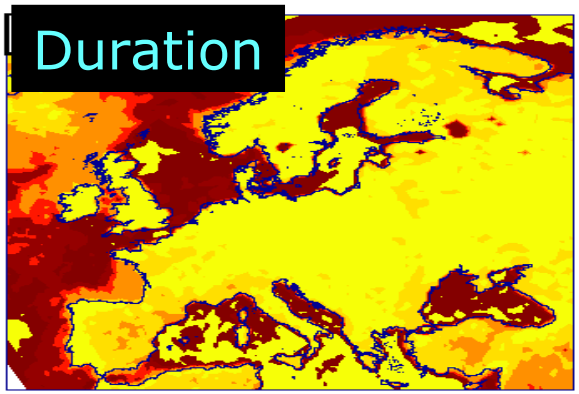
In Europe: the UK Climate Impacts Programme, the European Projects PRUDENCE and STARDEX. ENSEMBLES and NARCCAP have downscaled several GCMs to provide high resolution climate change scenarios for each region, though still only sampling a limited uncertainty range.

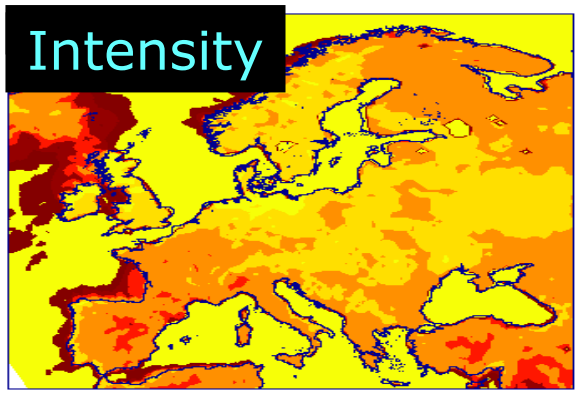
In South America: CREAS (*Regional Climate Change Scenarios for South America)* aims to provide high resolution climate change scenarios by downscaling have downscaled three GCMs, for raising assessing climate change impact, vulnerability and in designing adaptation measures.

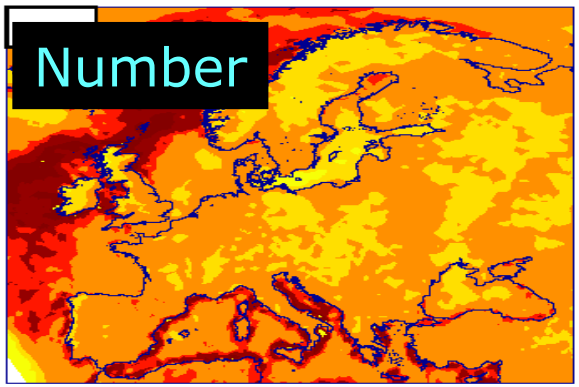
In Africa and Asia: The CSAG-UCT statistically downscaled data for 7-8 AR4 GCMs. Stations available across Africa and Asia.

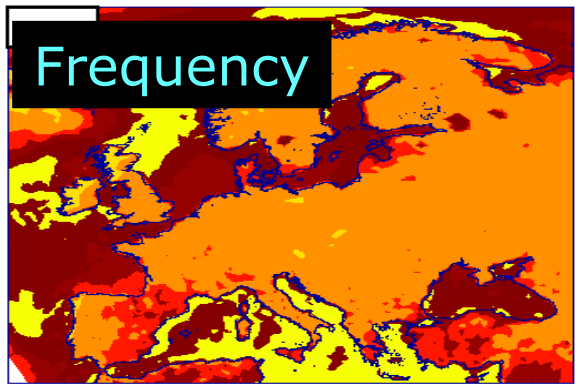
Training activities: PRECIS UK (various countries), ICTP (various countries), INPE Brazil-Gov of Spain (RIOCC, Latin American and Caribbean), MRI-World Bank (use of Earth Simulator GCM, Latin American and Caribbean)

Downscaling Experiences: PRUDENCE Changes in heat wave index in Europe (A2- 2100)





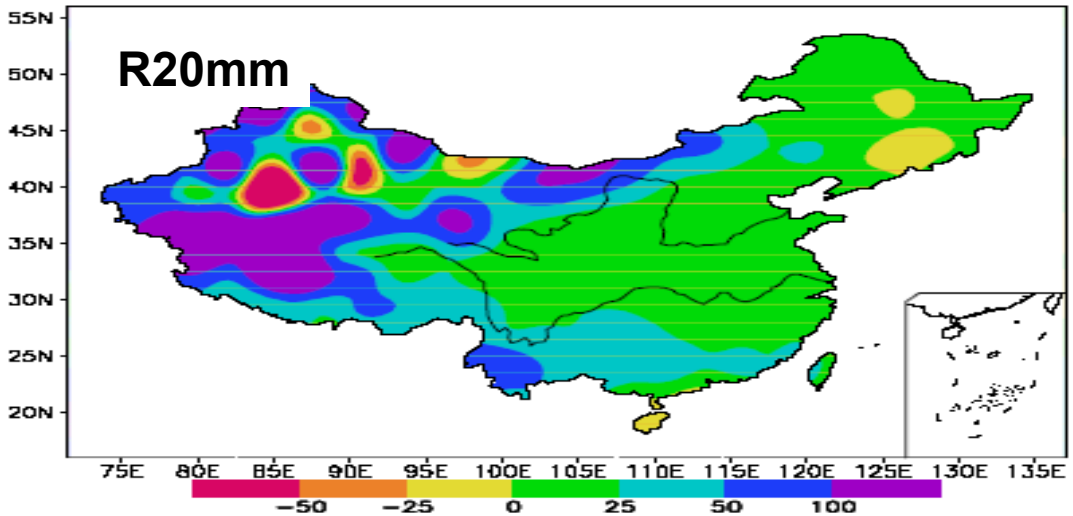


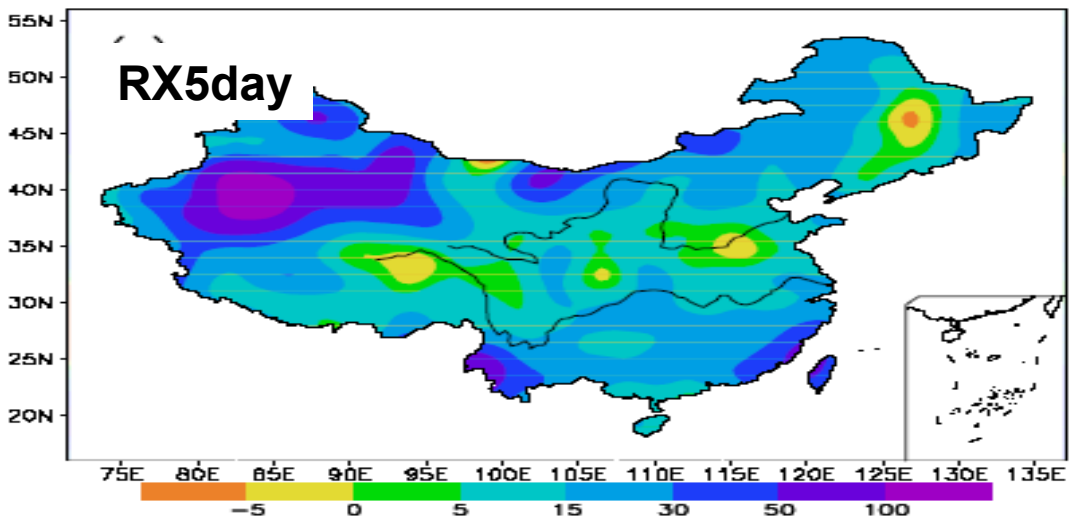


HIRHAM A2- Regional model- Denmark

→Increase in the frequency, intensity, duration of heat waves

PRECIS-China





The spatial distribution of the simulated increment of two rainfall extremes indices in China: R20mm-day with rainfall above 20 mm/day, RX5day-days with rainfall that may produce floods, (Unit: %)

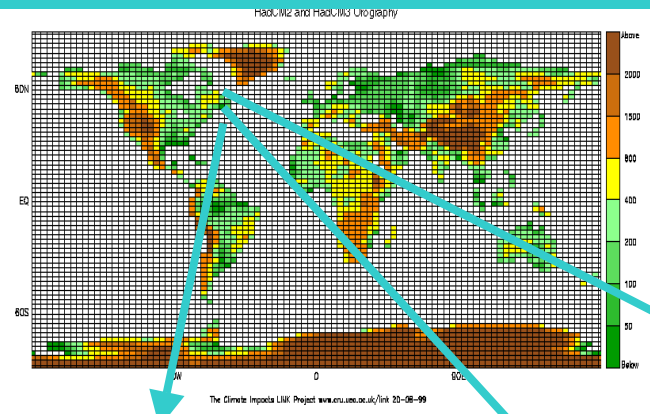
Future under the IPCC SRES B2 scenario for 2071-2100 relative to the present) in precipitation extremes in China:

Regional Climate Change Scenarios in South America (CREAS)

WMO

UNEP

Downscaling

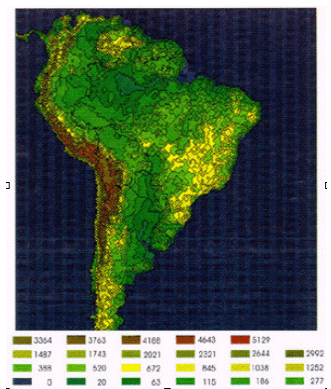


Climatology 1961-90

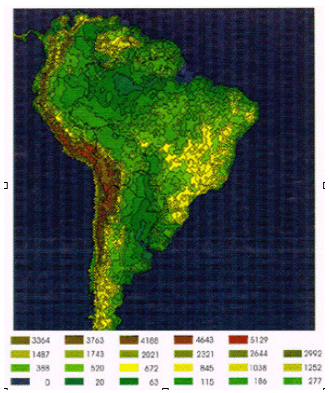
IPCC Scenarios A2, B2

Climate anomalies (future-present), from regional mulimodel ensemble Time slices 2071-2100, A2, B2

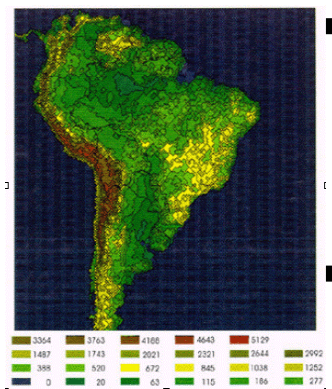
Regional models



RegCM3



HadRM3



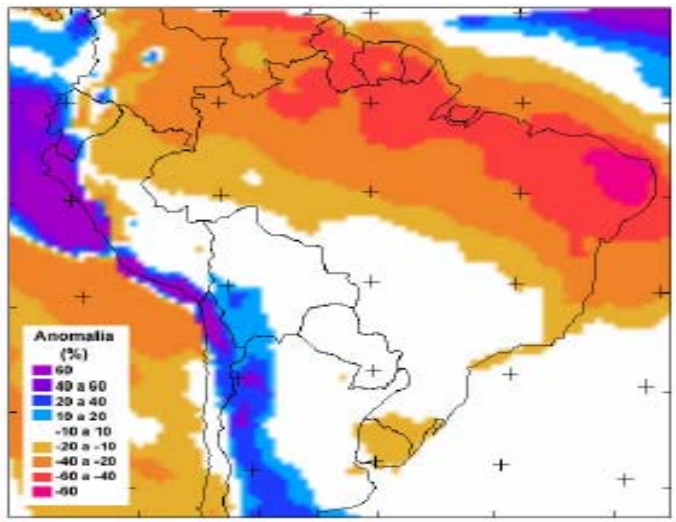
Eta CCS

Climatology regional model 1961-90

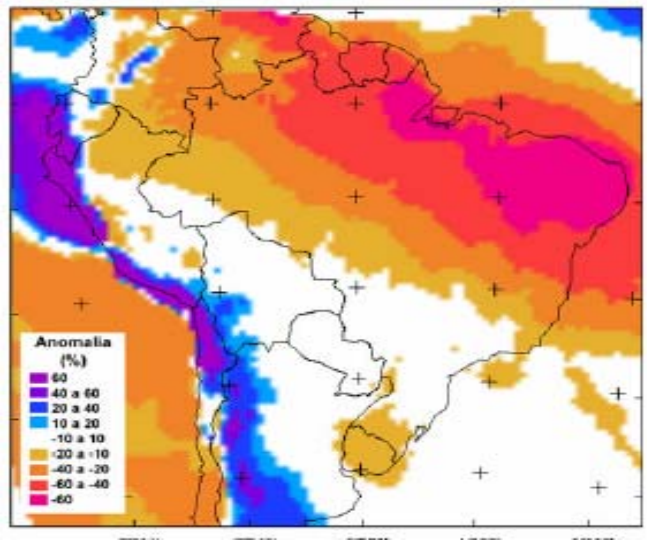
Maps of climate anomalies, and indices of extremes (Regional multimodel ensemble) 2071-2100, A2, B2

Climate Change projections in South America

Rainfall anomalies (%) (Annual) [(2071-2100)-(1961-90)]

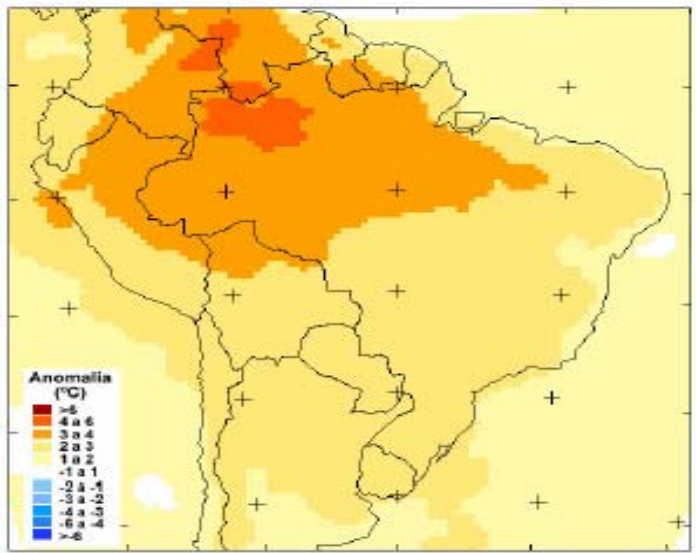


B2

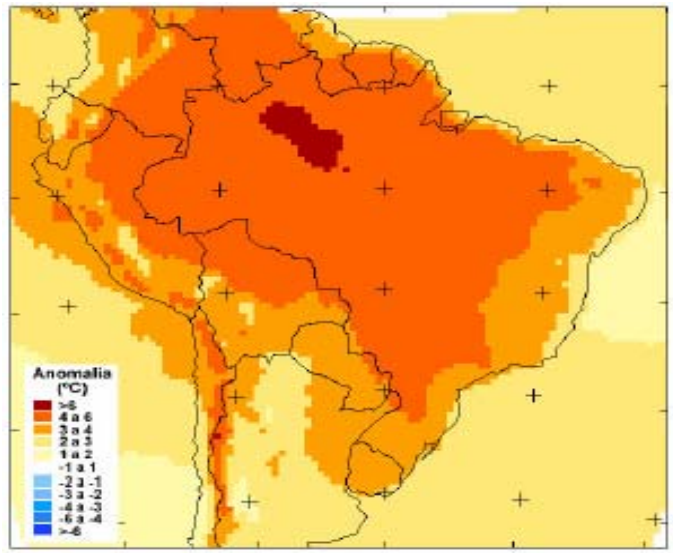


A2

Temperature anomalies (C) Annual [(2071-2100)-(1961-90)]



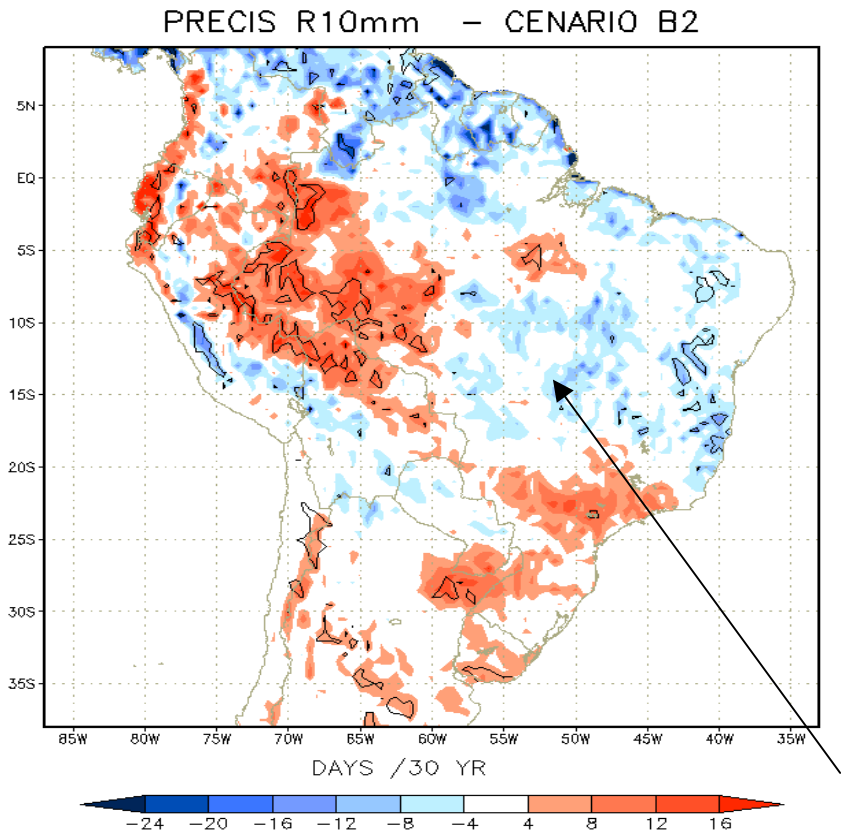
B2



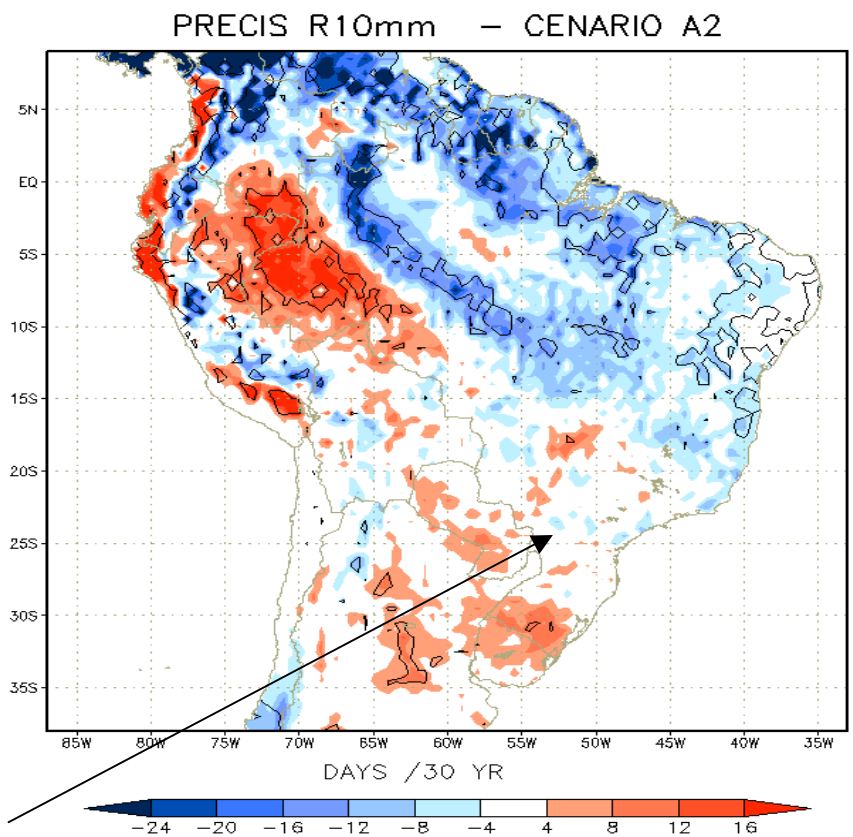
A2

Climate projection for rainfall extremes until 2100: HadRM3P

2071-2100, B2



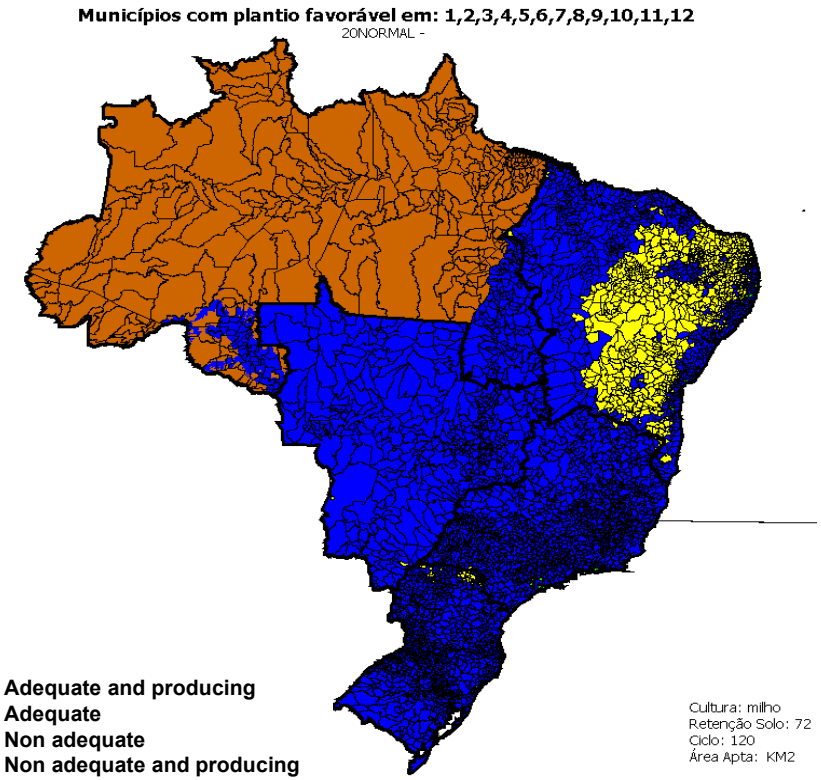
2071-2100, A2



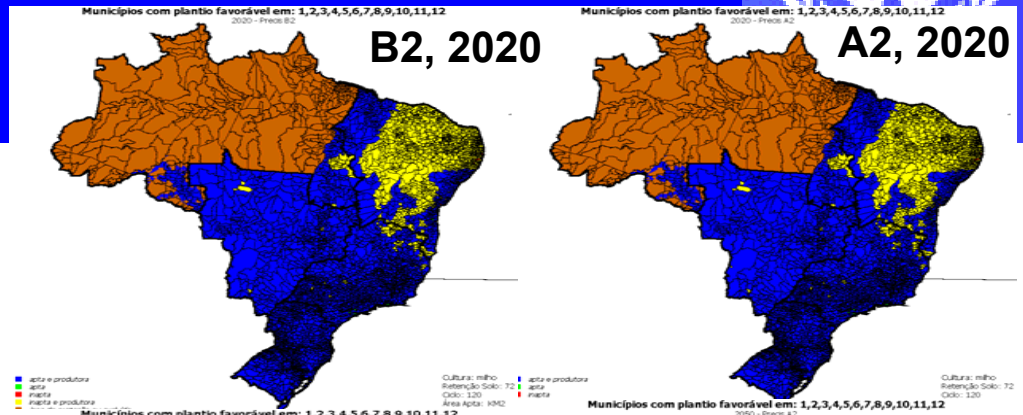
Increase in the frequency of intense rainfall events until 2100

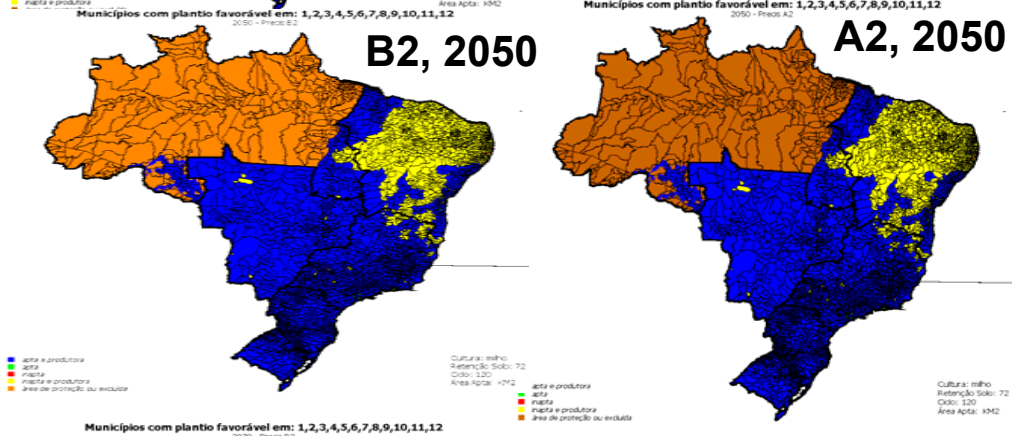
Applications of downscaled data: Experiences in Brazil

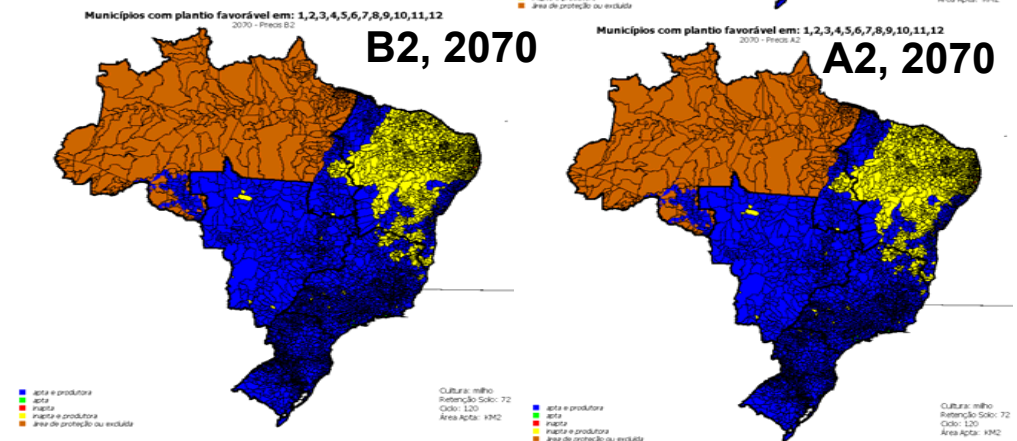
Corn zoning in Brazil



Present time 1961-90





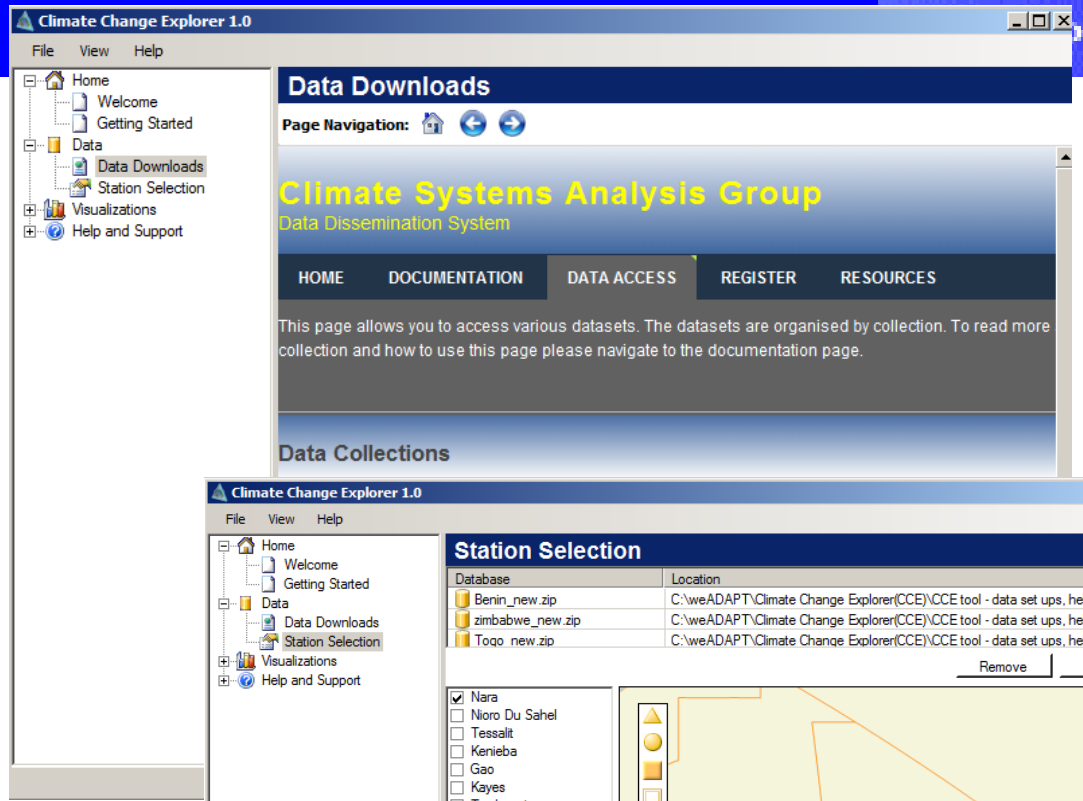


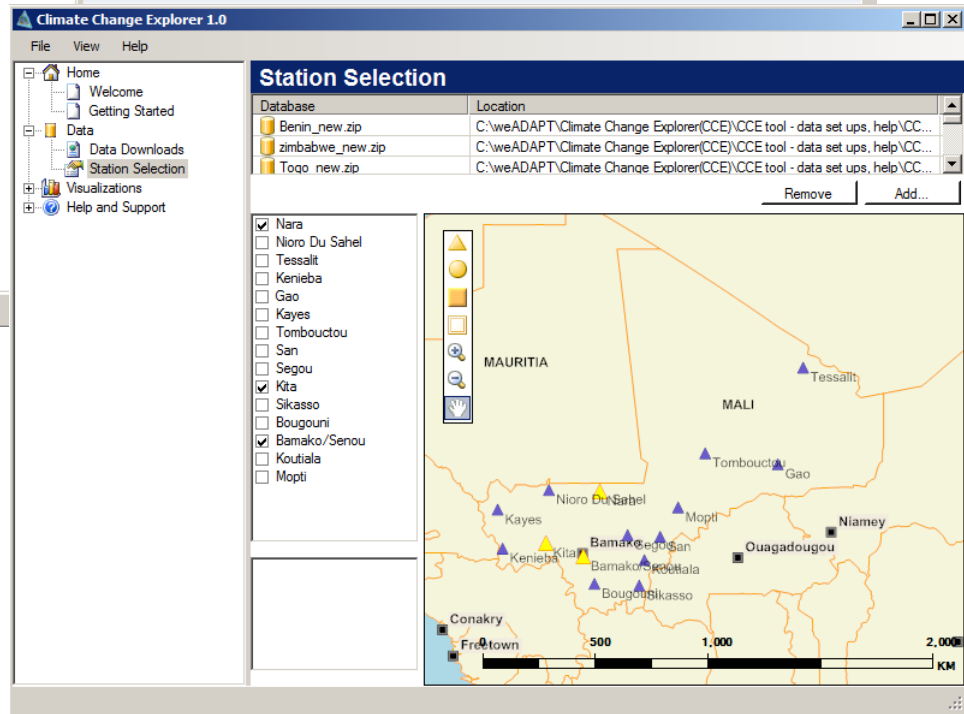
Downscaled African climate change scenarios

- Generally only few downscaled data exist for a limited number of GCMs and scenarios
- Most popular route to generating downscaled data is to use Regional Climate Models for 1-2 scenarios and potentially 1-2 GCMs, which is not ideal for assessing risks – usually restricted to a few specialised centres of expertise
- Some attempts at statistical downscaling but often not successful and complicated by misunderstandings of the techniques and their application
- Even once downscaled data is sourced there are often misconceptions about how to correctly interpret/use it. e.g. should the control climate look like reality ?
- Correctly using the downscaled data in applications and further impact (e.g. crop and hydrological) modelling, requires constant interaction and discussions (beyond workshop environments) between the producers of the downscaled climate change data and the impact modellers

Climate Change Explorer (CCE) tool

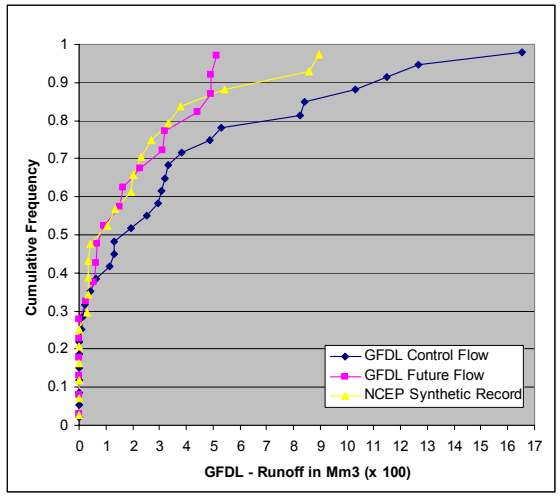
- Funded by ACCCA and developed in partnership between CSAG, SEI and Awhere Inc
- Allows users to download from the CSAG website statistically downscaled data for 7-8 AR4 GCMs. Stations available across Africa and Asia
- Users can explore the envelope of change from multiple GCMs
- Can explore changes in the seasonal cycle, histograms and frequency plots

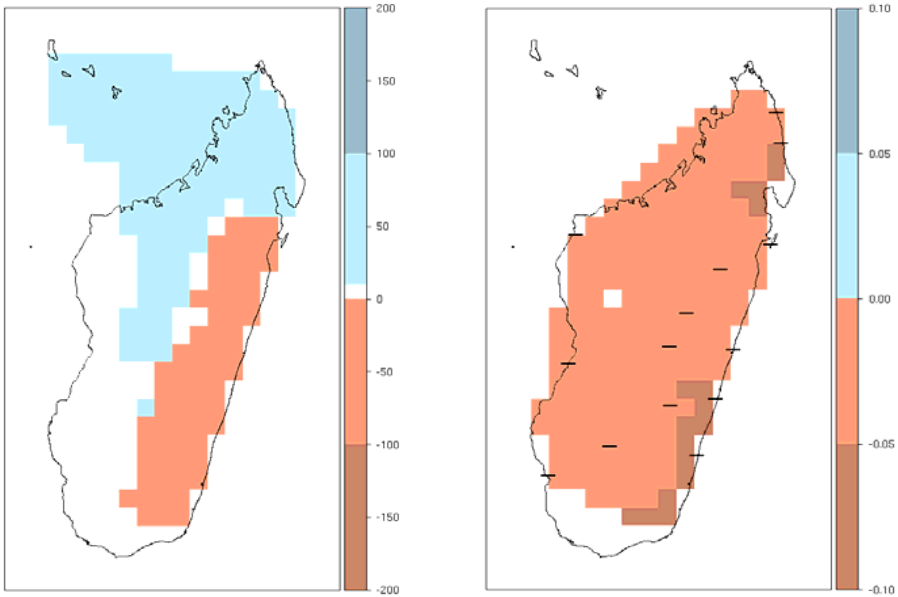




Applications of downscaled data: Experiences in Southern Africa

- Modelling changes in runoff, dam yields and agricultural production in Namibia [courtesy Desert Research Foundation of Namibia and G. Van Langenhove]





- Comparing observed historical trends with projected downscaled changes in Madagascar – is climate change observable or expected in the future ?

Gaps and Needs

- Development of regional and sub-regional climate scenarios in Central American and Caribbean, Indian subcontinent, Small islands.
- User education and design principles that account for levels of analysis and uncertainties (training activities)
- Robust decision exploration based on model outputs and reliability of models (need to convince potential users on the benefits of regional climate change scenarios for IVA applications)
- Resources related to data access and distribution (easy access, visualization..)

References

www.weADAPT.org

– tool access, documentation, Q&A

http://data.csag.uct.ac.za/

- Climate Systems Analysis Group data access portal

http://www.cptec.inpe.br/mudancas_climaticas

- Q&A, regional climate change scenarios data access portal