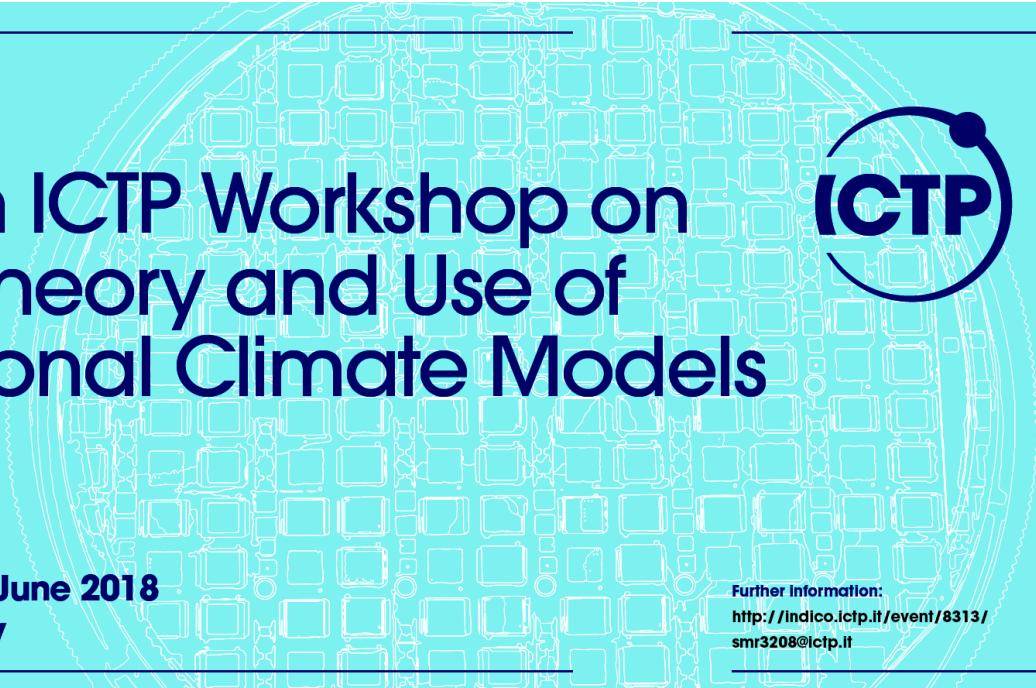


# South America CORDEX project using RegCM

Taleena Sines, Erika Coppola, Filippo Giorgi, Lina Sitz  
[tsines@ictp.it](mailto:tsines@ictp.it)

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**Ninth ICTP Workshop on  
the Theory and Use of  
Regional Climate Models**

**28 May - 8 June 2018**  
**Trieste, Italy**

**Further Information:**  
<http://indico.ictp.it/event/8313/>  
[smr3208@ictp.it](mailto:smr3208@ictp.it)

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# IPCC 5<sup>th</sup> Assessment Report

## Largest contributors:

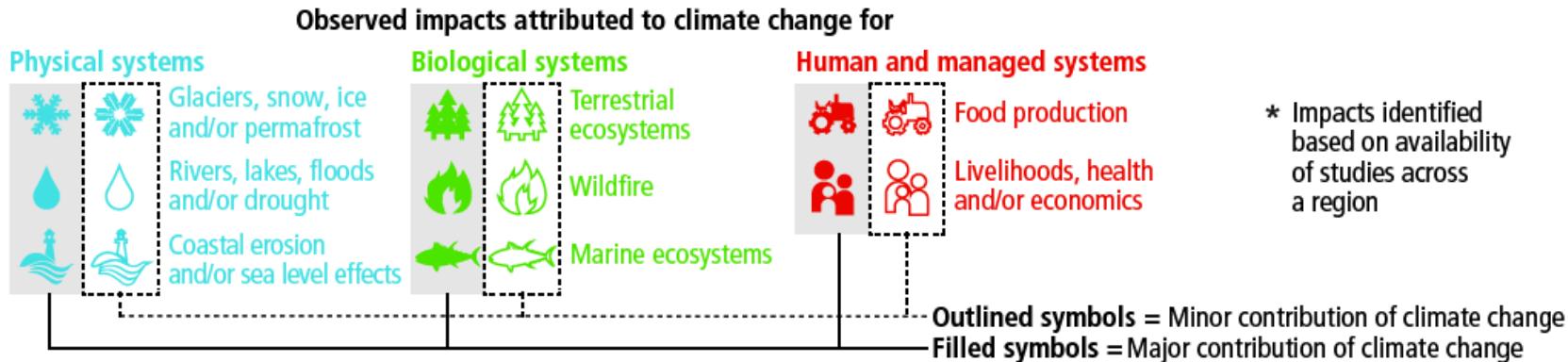
- Glaciers, snow, ice, and/or permafrost
- Rivers, lakes, floods, and/or drought
- Marine ecosystems
- Food Production
- Livelihoods, health, and/or economics



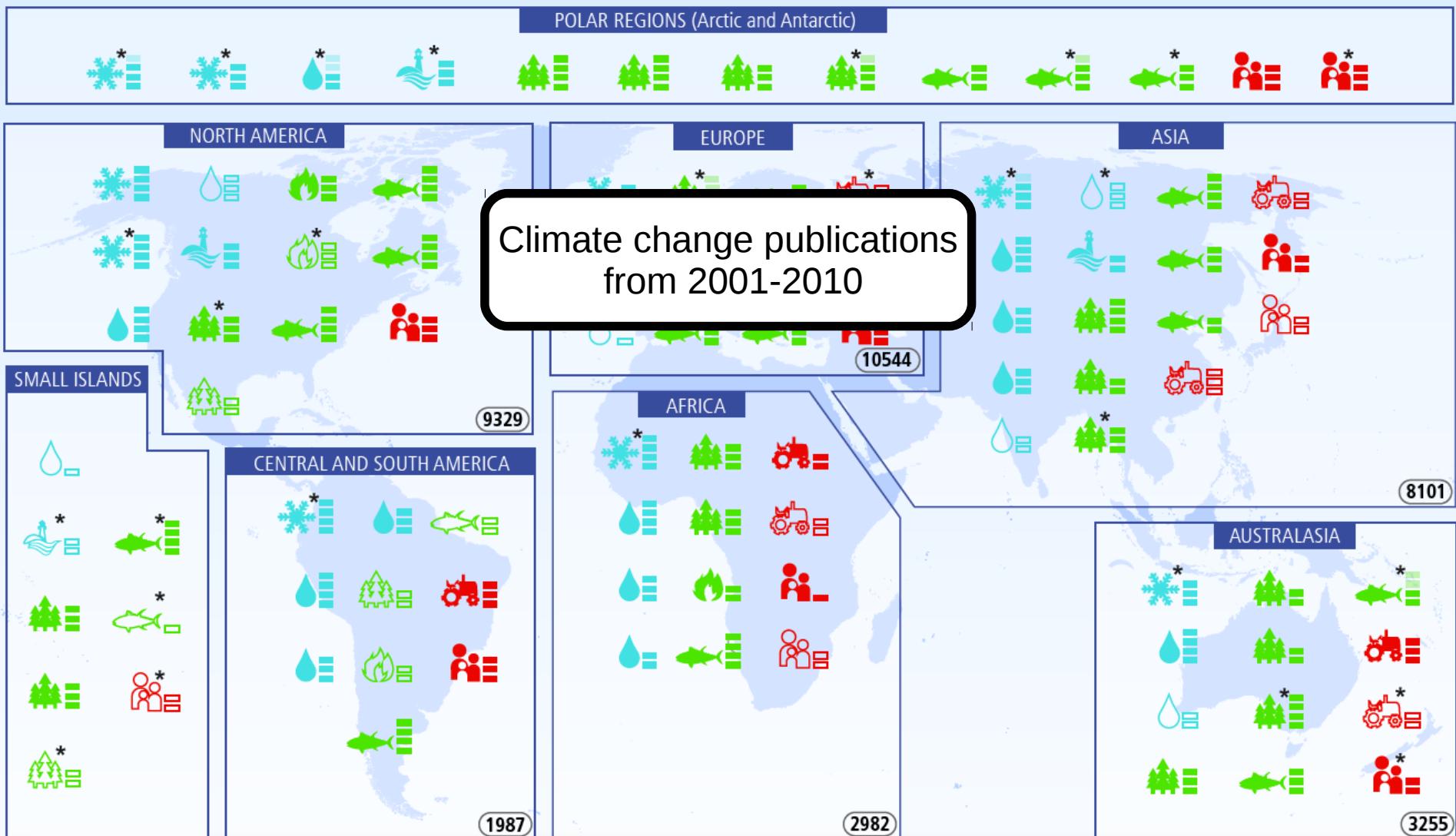
Confidence in attribution  
to climate change

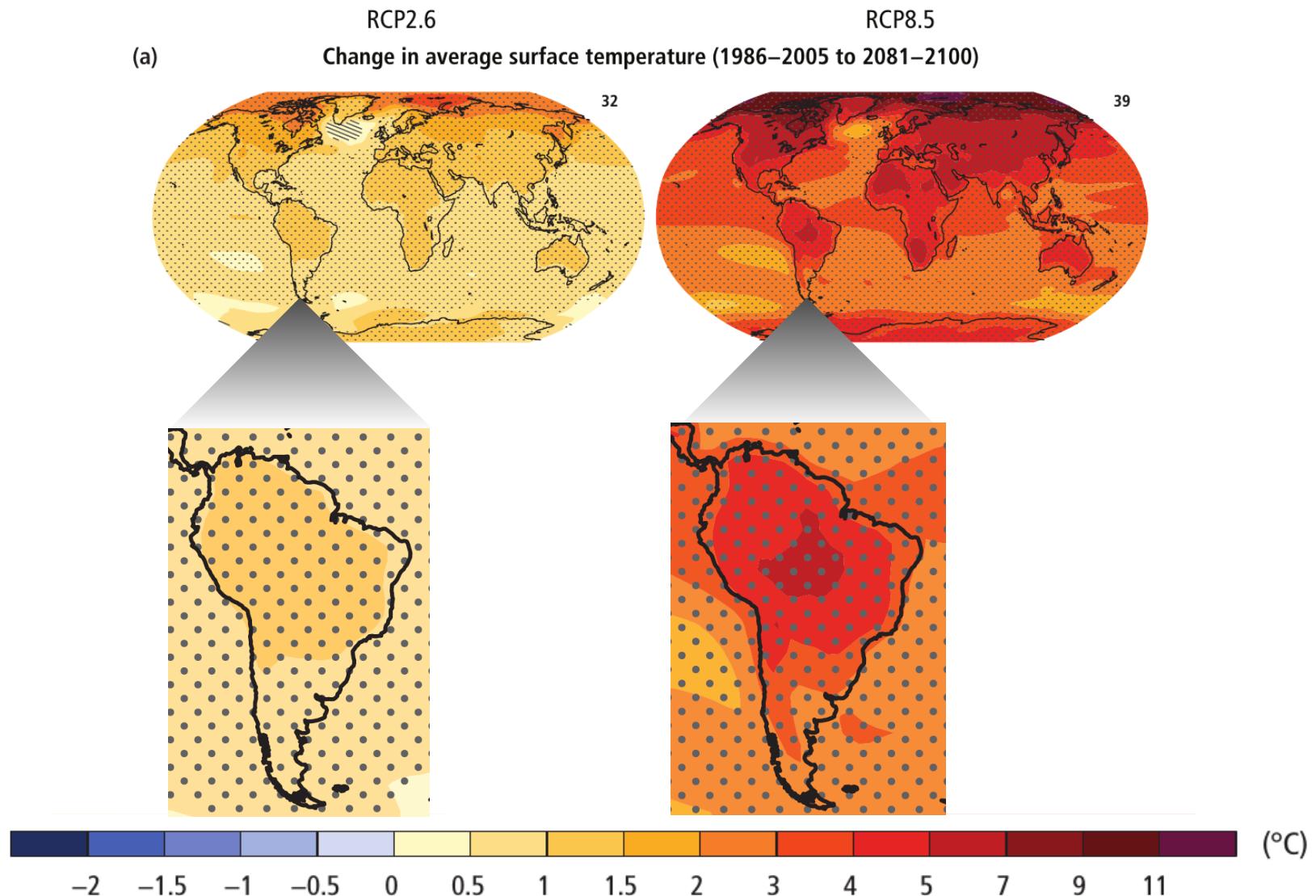
very low   low   med   high   very high

□ indicates confidence range

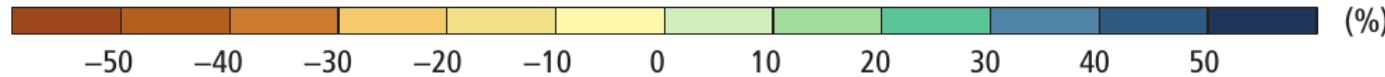
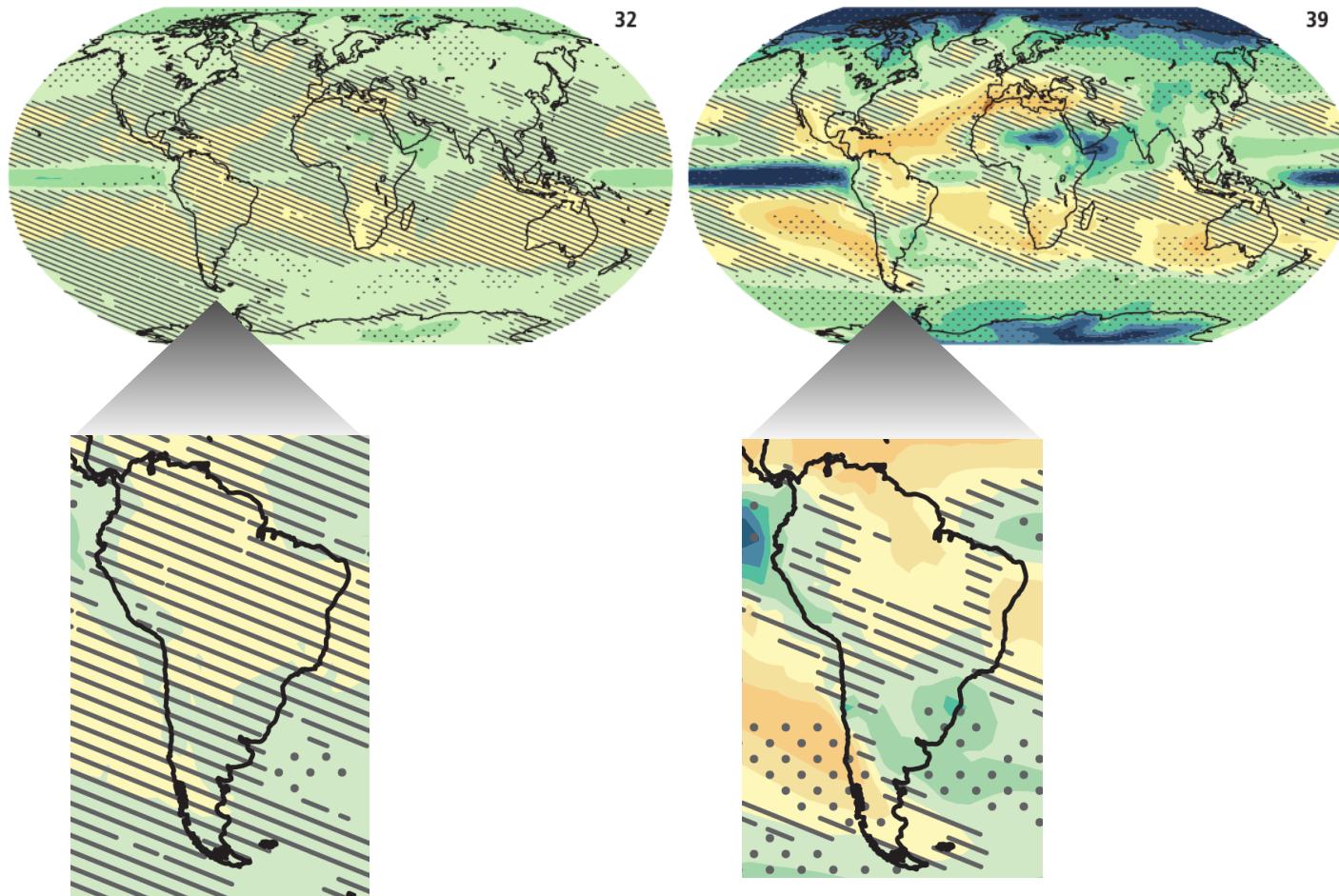


## Widespread impacts attributed to climate change based on the available scientific literature since the AR4

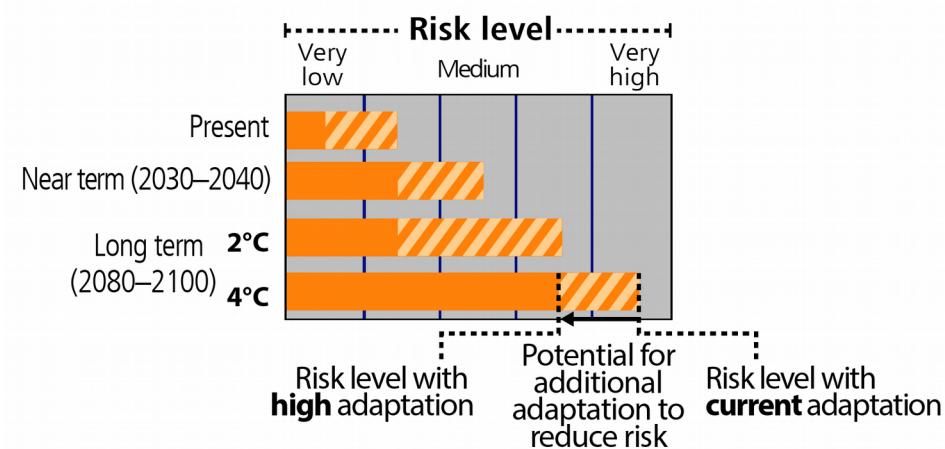
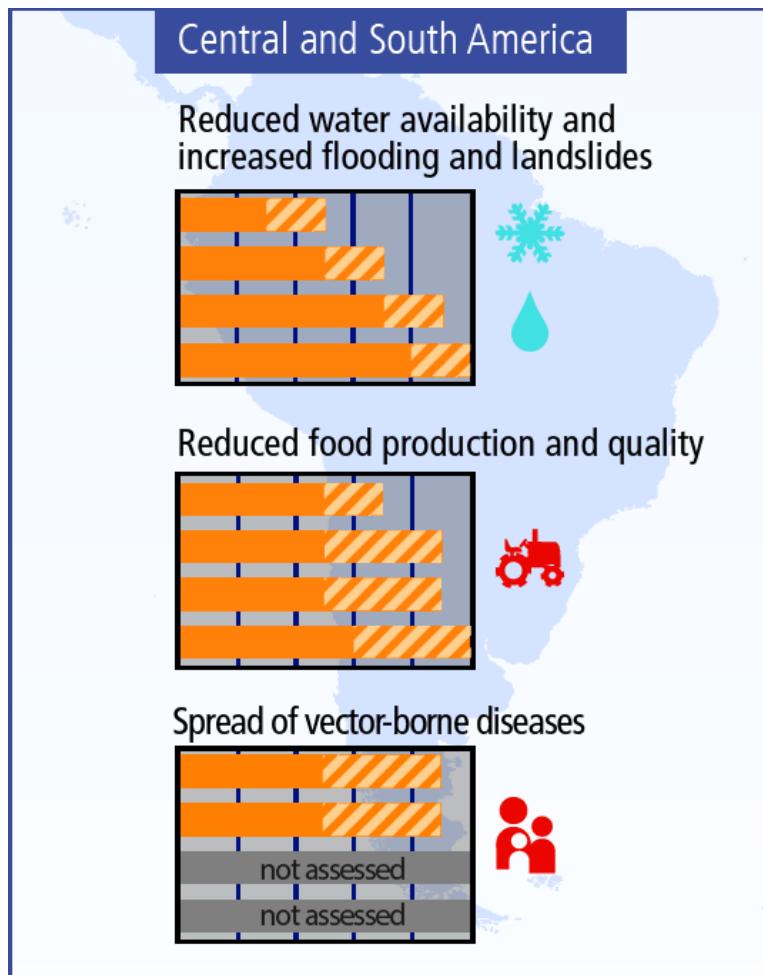




(b)

**Change in average precipitation (1986–2005 to 2081–2100)**

## Regional key risks and potential for risk reduction



# Project Design

## Physics

Cumulus

Tiedtke (1996) L  
Kain-Fritsch (1990) O

Boundary Layer

Holtslag PBL (1990)

Ocean Flux

Zeng et al (1998)

Land-Surface

CLM

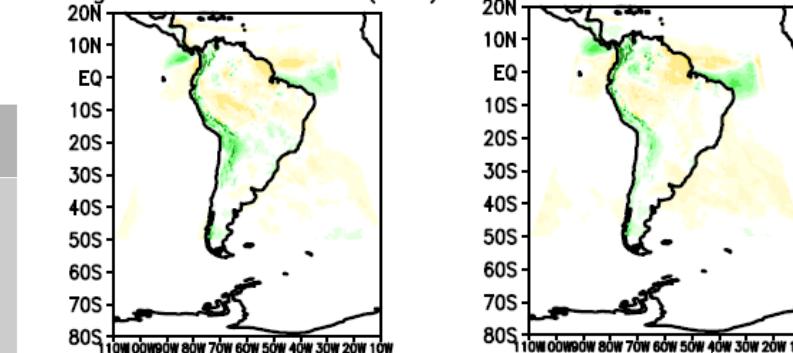
## SUBEX MOISTURE

cevaplnd = 1.0e-5

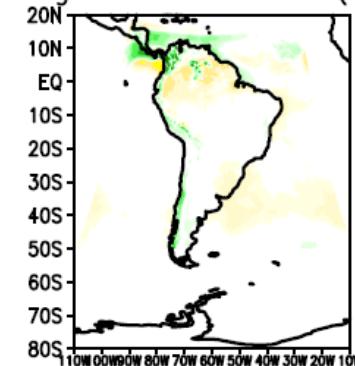
cevapoce = 1.0e-5

! Raindrop evap rate coef [[(kg m<sup>-2</sup> s<sup>-1</sup>)<sup>-1/2</sup>]/s]

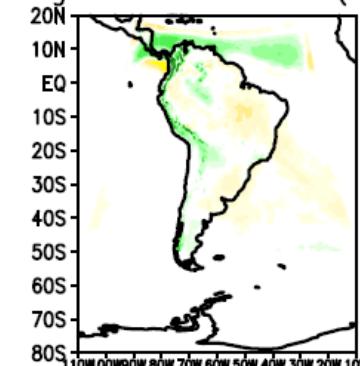
RegCM4–TRMM bias (DJF) RegCM4–TRMM bias (MAM)



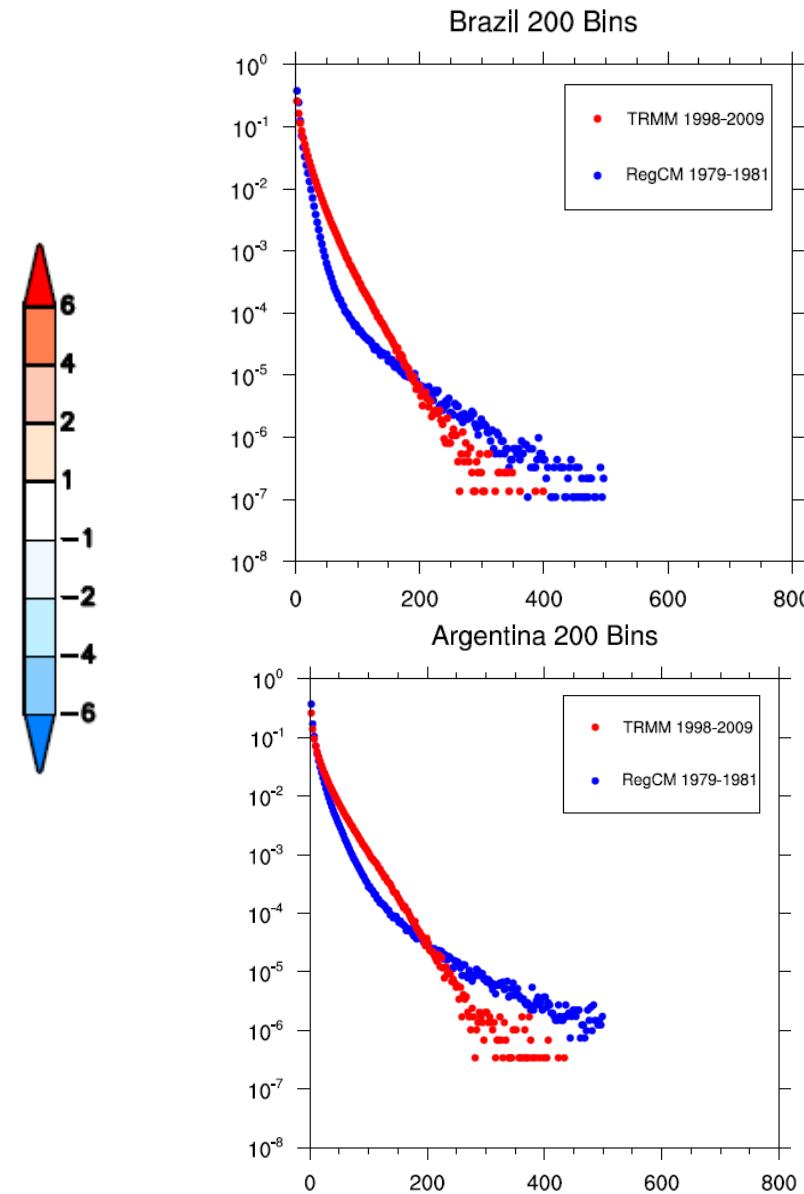
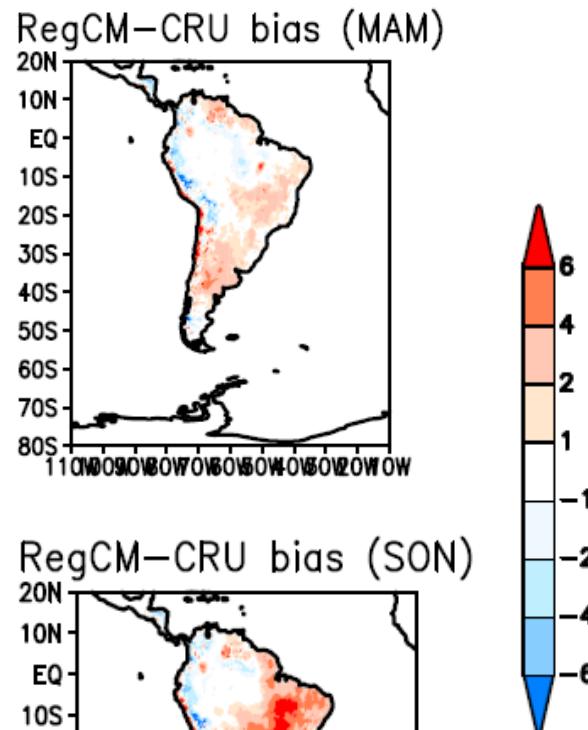
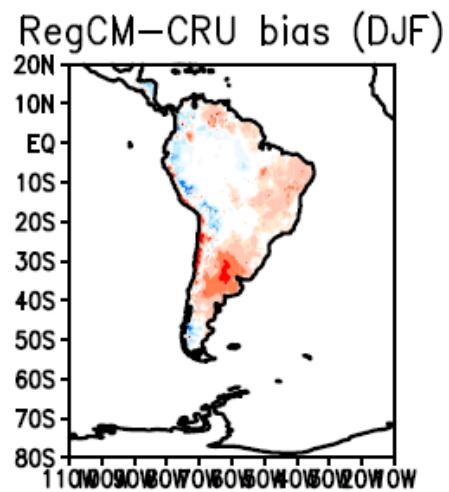
RegCM4–TRMM bias (JJA)

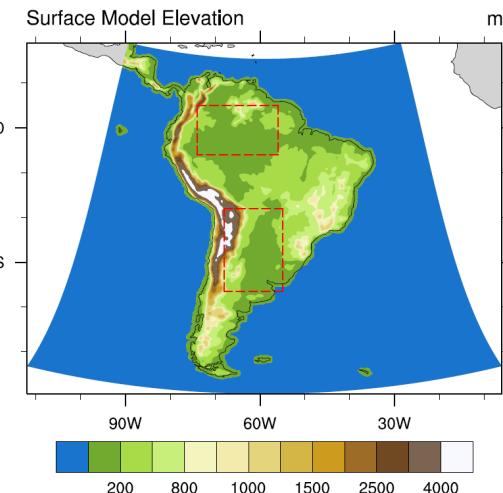
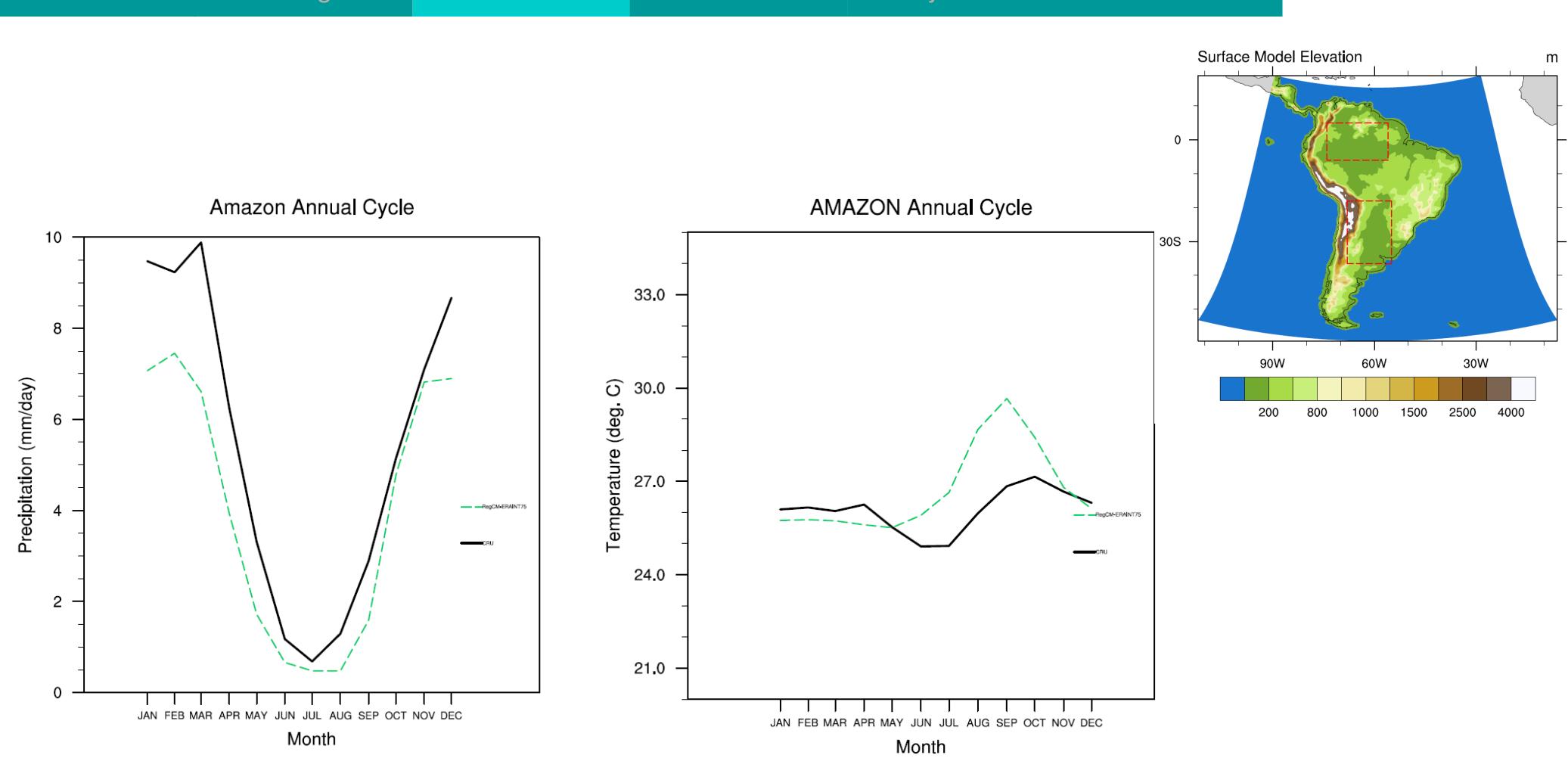


RegCM4–TRMM bias (SON)

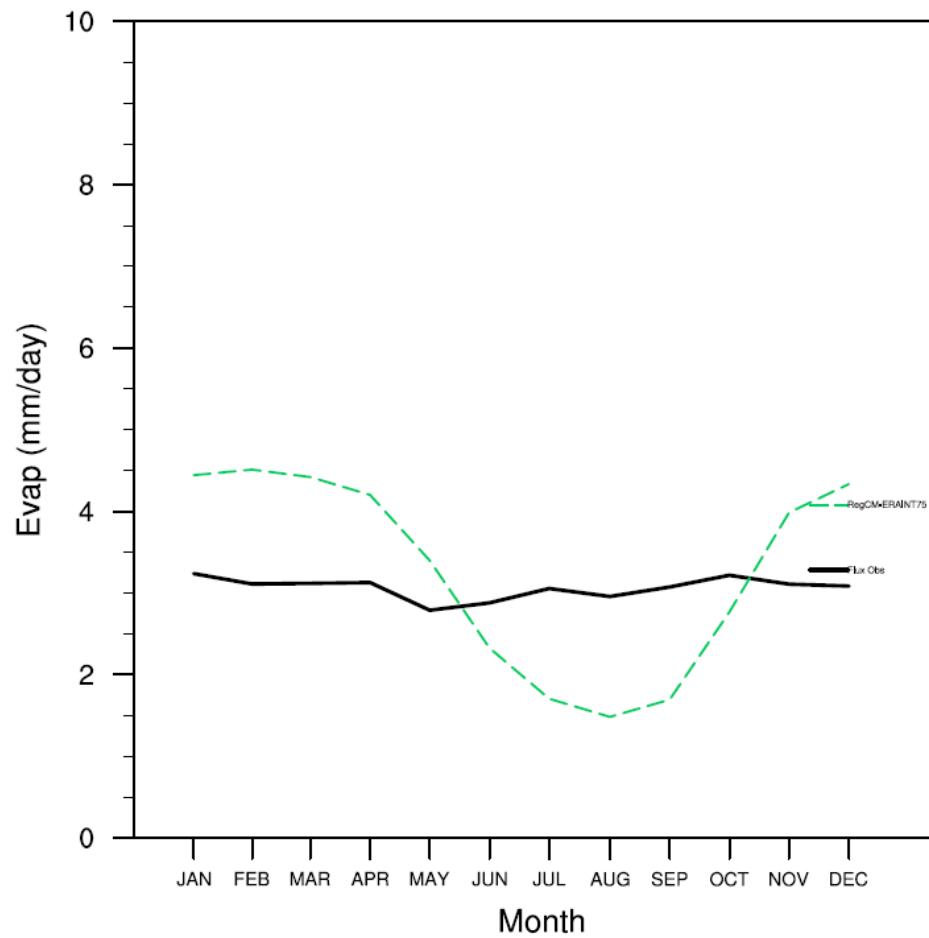


iy = 363  
jx = 333





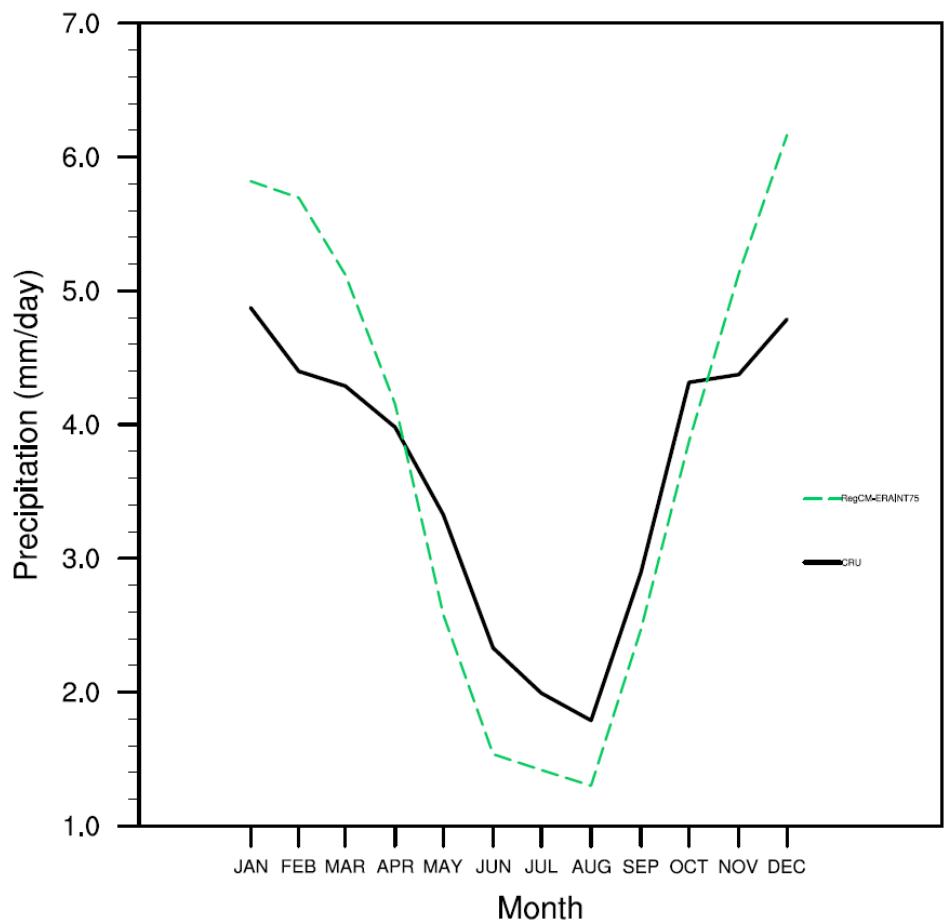
## AMAZON Annual Cycle



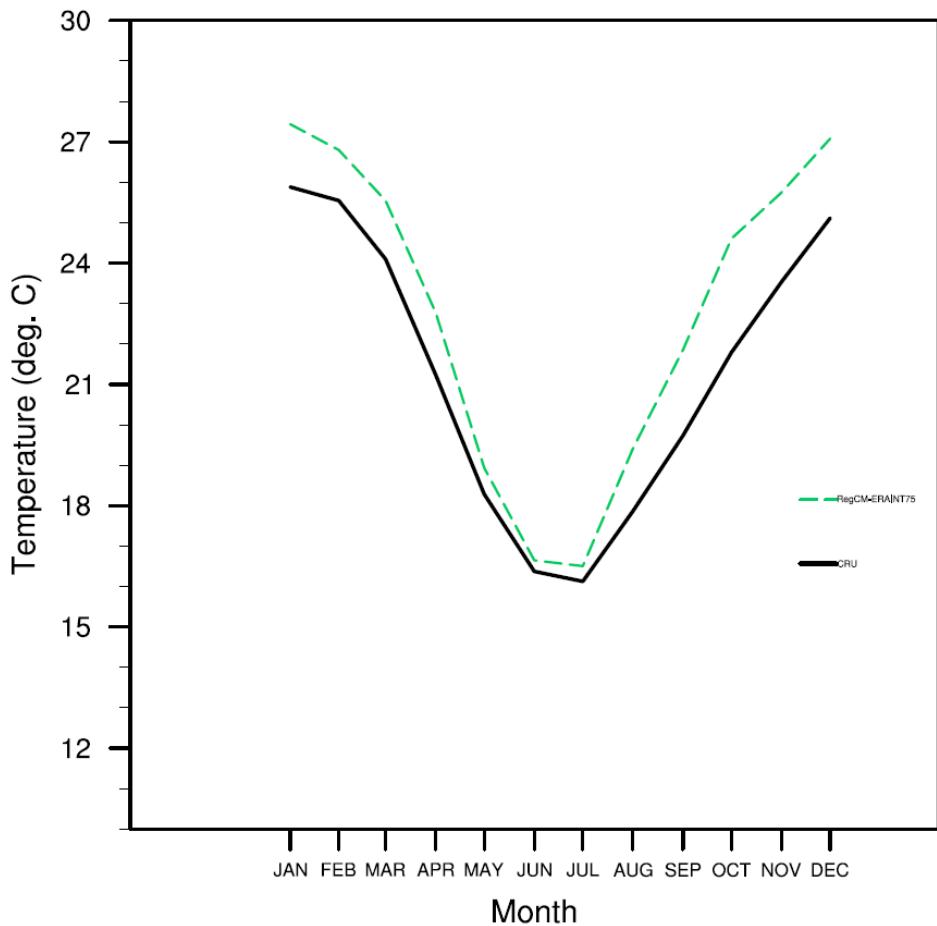
Thank you Marta Llopart

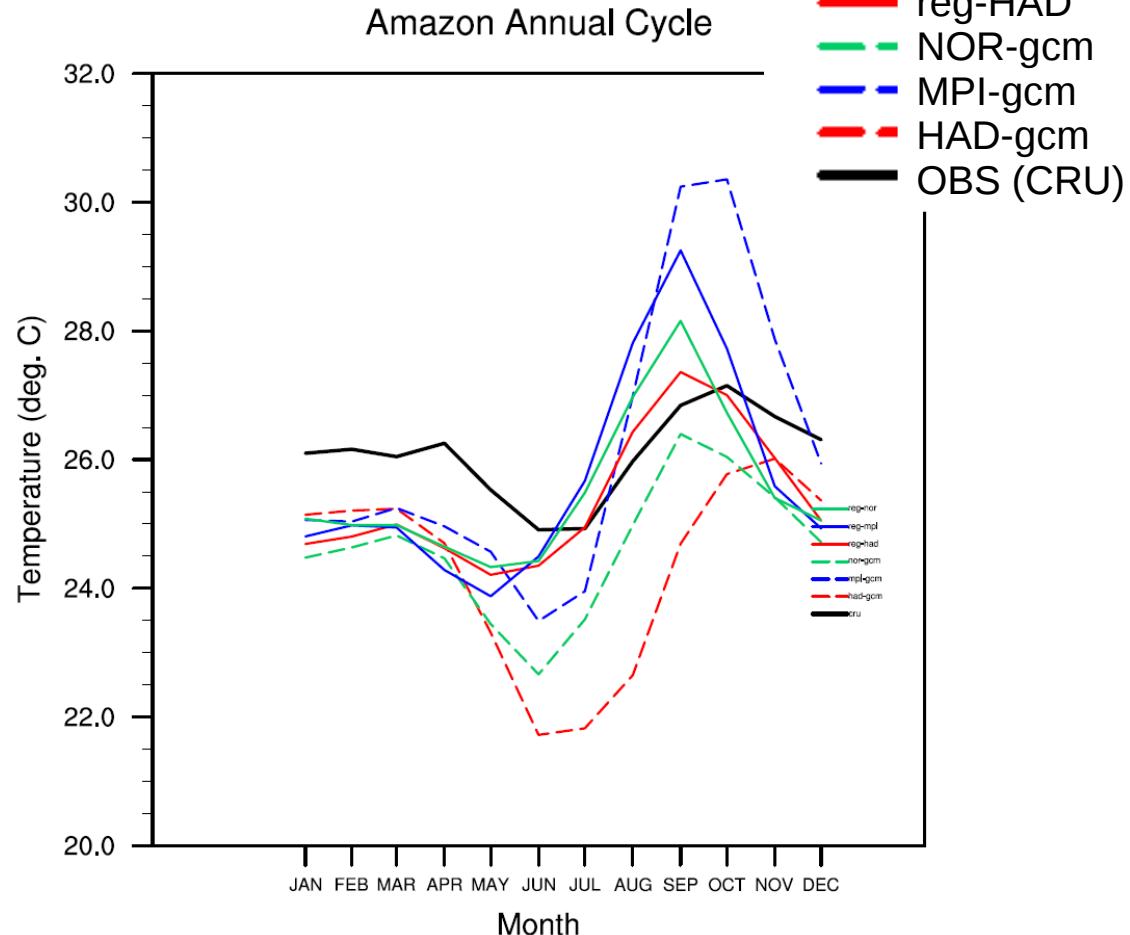
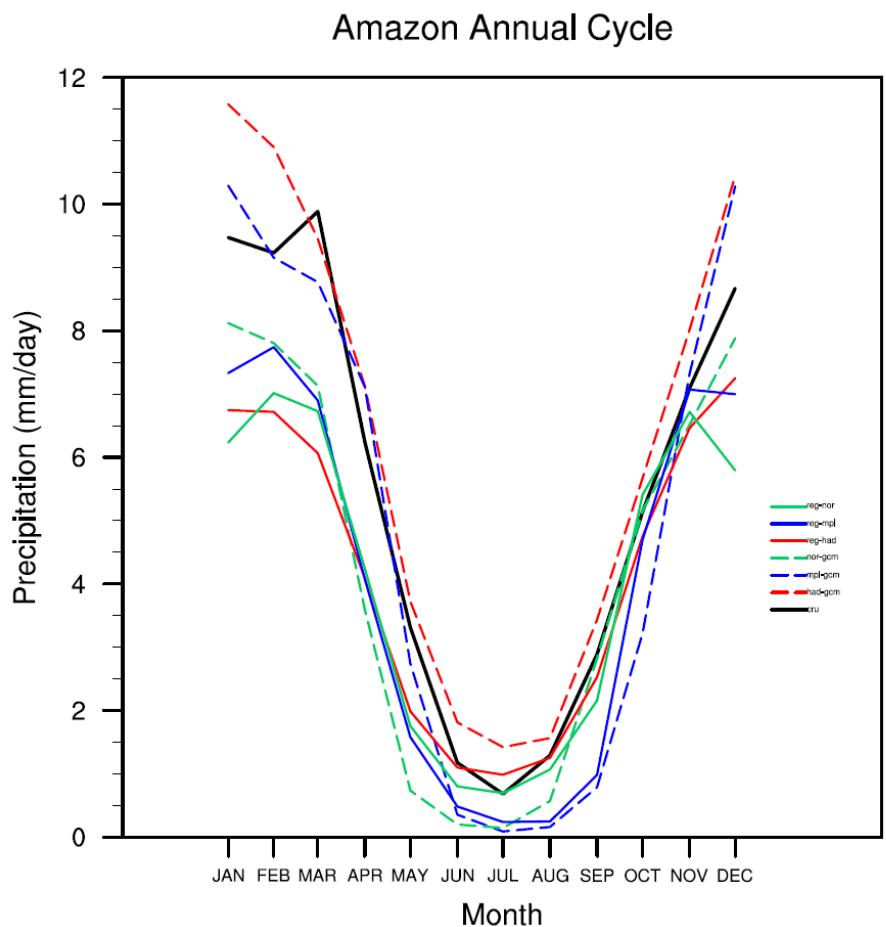
Sensitivity of simulated South America climate to the land surface schemes  
in RegCM4

LPB Annual Cycle

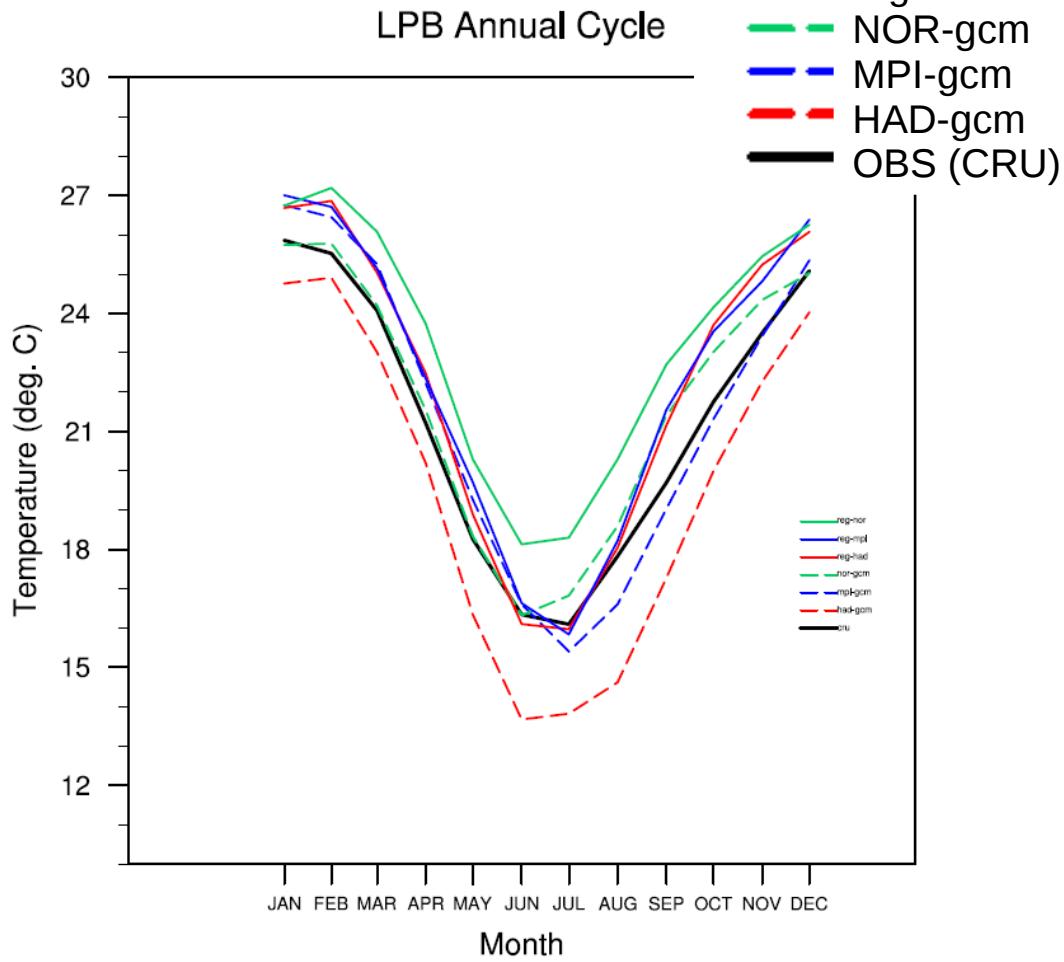
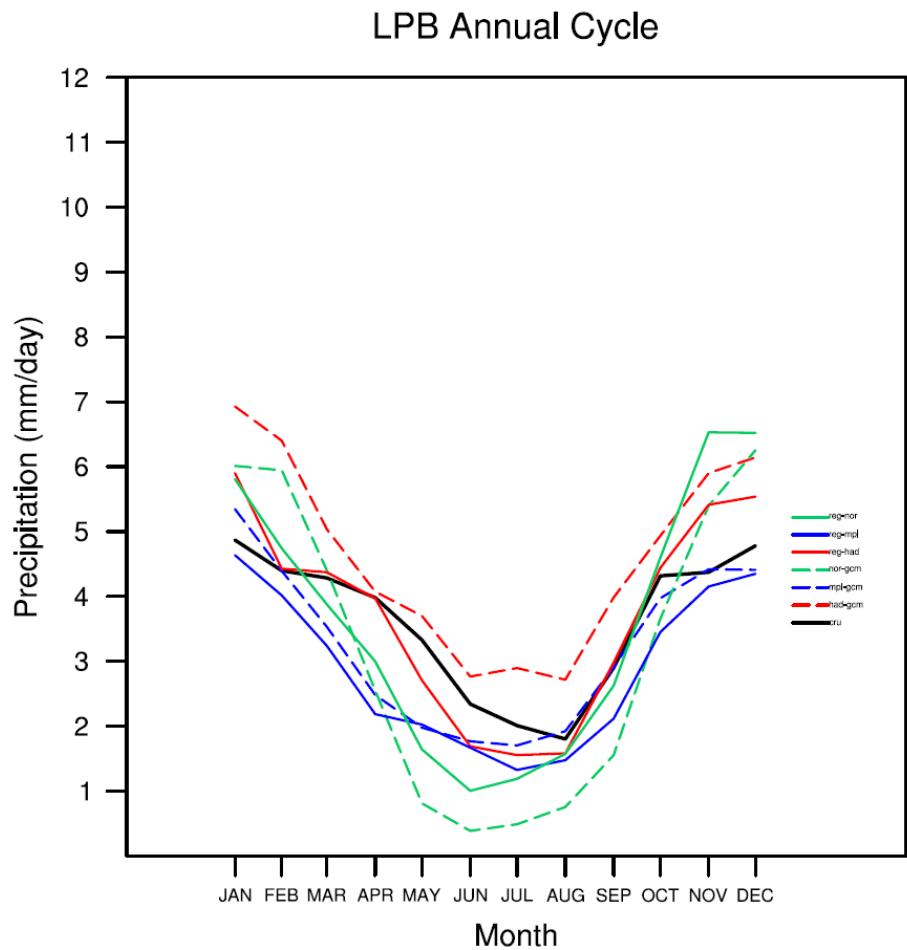


LPB Annual Cycle





- reg-NOR
- reg-MPI
- reg-HAD
- NOR-gcm
- MPI-gcm
- HAD-gcm
- OBS (CRU)



## Simulation Progress

## Evaluation – Complete (1979-2015)

## Historical – Complete (1970-2005)

## Simulation Progress

## Evaluation - Complete

## Historical - Complete

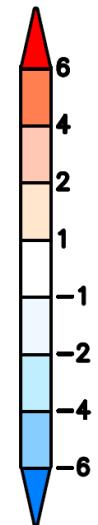
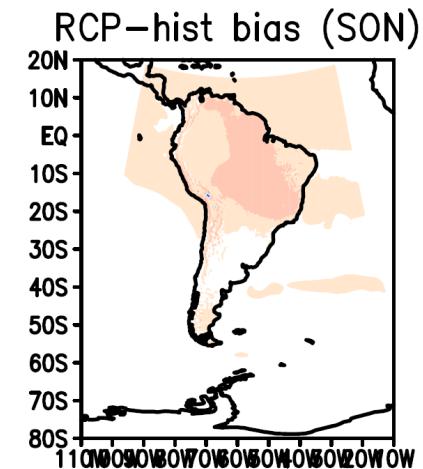
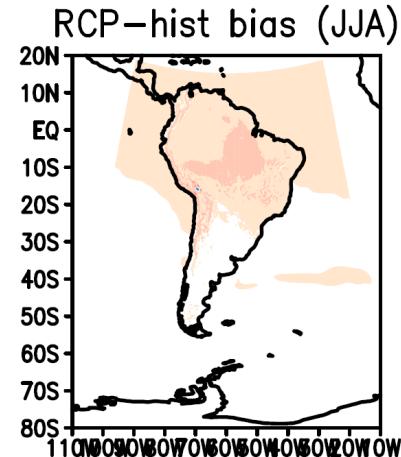
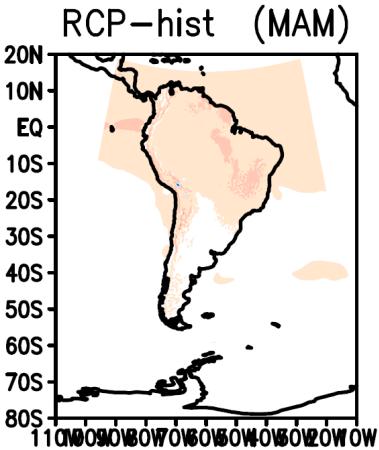
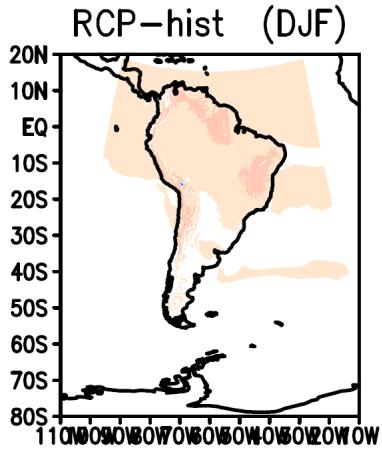
\*HadGEM

\*MPI

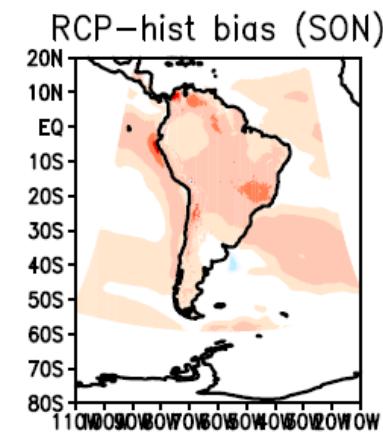
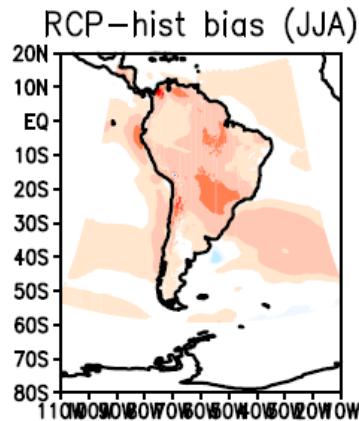
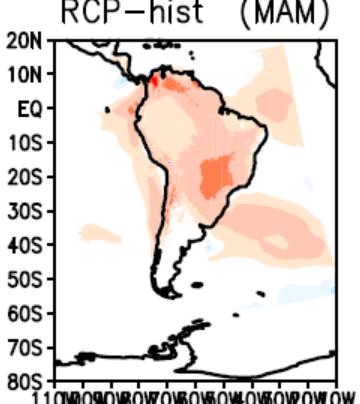
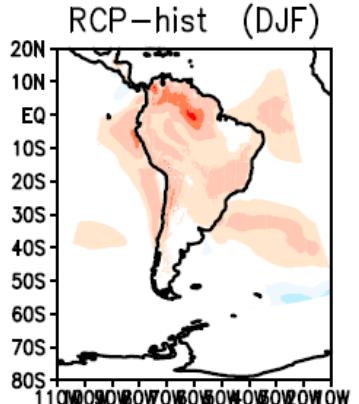
\*NorESM

10 years available for  
workshop analysis  
(daily and monthly)

HadGEM RCP2.6 (2005-2100)



NorESM RCP8.5 (2005-2100)



More to Come...

# Thank You

## Enjoy the Workshop!



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**Trieste, Italy**

Further information:  
<http://indico.ictp.it/event/8313/>  
[www.ictp.it](http://www.ictp.it)

**ICTP**

This is the ninth edition of the biannual ICTP workshop series on regional climate modeling and the ICTP model RegCM. The focus of this workshop will be on the analysis of a new generation of climate change projections over regions worldwide, as part of the CORDEX program.

#### Description:

The ICTP regional climate modeling system RegCM4 is part of the CORDEX-CORE initiative, which aims at the provision of a new set of downscaled climate projections from the CORDEX domains for two greenhouse gas concentration scenarios (RCP2.6 and RCP4.5) at a horizontal grid spanning the globe. This work is currently being completed at ICTP and other laboratories as a community effort aimed at producing climate information for impact assessment studies and contributing to the activities of the Intergovernmental Panel on Climate Change (IPCC). It is expected that by the date of the workshop, the first set of RegCM4 projections will be available for multiple domains, and therefore the workshop will be an optimal venue to analyse these projections and exchange experience across different domains. The comparison of the RegCM4 model and with the analysis of regional model output is an important requirement for participation.

#### Topics:

- Tutorials and extensive hands-on sessions on the theory of regional climate change and regional climate modeling as well as the use of the RegCM4 model, with focus on the analysis and interpretation of the output of regional model projections;
- Assessment of projected precipitation, performance metrics and model systematic errors, identification and quantification of added value, study of phenomena relevant to different regions and their interactions and their dependence on model biases;
- Scientific paper writing;
- Short research projects on the analysis of the next generation RegCM4 projections over different CORDEX domains;
- Completion of short research projects.

#### Directors:

Filippo Giorgi, ICTP Italy  
Eduardo Cappallo, ICTP Italy  
Mouhammadou B. Sylla, WASCAL, Burkina Faso  
Maria Llopis, UNEP Brazil

#### Speakers:

M. Ashfaq, ORNL, USA  
M. Balda, Charles U., Czech Republic  
M. Bopp, MPI, Germany, USA  
T. Canevascini, CICESE, Mexico  
S. Das, ICTP Italy  
A. Fanfani, ICTP Italy  
E. Fuertes-Franco, SMHI, Sweden  
X. Gao, IAP, CAS, China  
T. Helama, Charles U., Czech Republic  
J. Hoskins, The Queen's University of Science and Technology, Canada  
E. Mazzarella, ICTP Italy  
E. Pohjola, ICTP Italy  
E. Pofidja, U. de São Paulo, Brazil  
L. Teardo, U. de São Paulo, Brazil  
T. Timmerman, U. of Maryland, USA  
C. Tomas, Eötvös Loránd U., Hungary

#### Lab Instructors:

S. Das, ICTP, Italy  
S. Di Sante, ICTP, Italy  
G. Giudani, ICTP, Italy  
E. Battistella, ICTP, Italy

#### Deadline:

15 February 2018

#### How to apply:

Online application:  
<http://indico.ictp.it/event/8313/>

Female scientists are encouraged to apply.

#### Grants:

A limited number of grants are available to support the attendance of selected participants, with priority given to participants from developing countries. There is no registration fee.

