

## CORDEX Africa strategic meeting

On 26 June CORDEX Africa held a strategic meeting online. The objectives for this meeting were to outline priorities for future activities and make a draft master plan for the coming years.

Read more about the event [here](#).



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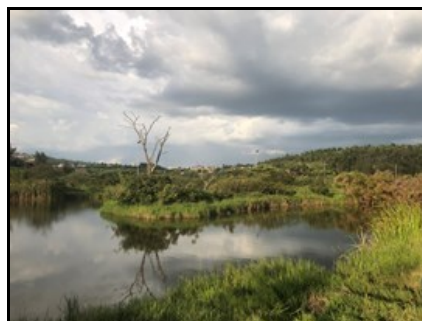
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## Welcome to new Points of Contact and thank you to others!

During the first half of 2024 we have had some changes in the dedicated group of Points of Contact (POCs). The POCs are the contact persons for their domain and are playing a significant role for CORDEX achievements within the different domains.

For the North America domain we welcome Rachel McCrary and Stefan Rahimi. At the same time two of our POCs for this domain have stepped down. Bill Gutowski and Linda Mearns have been involved since the beginning and Bill also served as a Science Advisory Team (SAT)-member and SAT co-chair for many years. Thank you to both of you!



In CORDEX Africa two additional POCs have joined us, Amira Nasser Mostafa and Rondrotiana Barimalala, to ensure that the big domain has representatives from the entire continent. Amira represents North Africa and Rondrotiana represents the African Islands.

Here you can find all [CORDEX Points of Contact](#)

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## CORDEX Science Advisory Team is meeting in September

A hybrid Science Advisory Team meeting will be held in Santander, Spain and online in September. For part of the meeting the CORDEX Points of Contact (POCs) and the Flagship Pilot Studies PI:s are also invited to discuss the new Task Forces, scientific topics as well as organizational issues.

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### CORDEX South America and CORDEX Central America domains

CORDEX South America (SAM) and Central America (CAM: Mexico, Central America, and the Caribbean) domains, conforming the Latin America CORDEX region, have collaborated in many CORDEX initiatives throughout the years to improve the regional climate modeling capacities, the understanding of physical processes and their impacts, and to support scientific capacity.

The initial activities were developed in the framework of a collaboration between VAMOS (CLIVAR) and CORDEX, and co-financed by WCRP, ICSU, and the IAI. In 2013 and 2014, two major capacity building activities were organized in Lima, Peru, and Santo Domingo, Dominican Republic with the aim of bringing together the international community of regional climate scientists to pursue an initial assessment of the various CORDEX downscaling initiatives over the South American and Central American CORDEX domains, to develop regionally focused vulnerability, impact and adaptation (VIA) user-knowledge, and to identify stakeholders' needs to support science-based information required for climate adaptation, mitigation and risk management in the region. These two events gathered more than 130 scientists from Latin America and the Caribbean together and were the initial seed to coordinate regional climate science in the region.

#### Dynamical and statistical downscaling simulations

In these 15 years, the regional climate model (RCM) simulations for the two domains increased from ~50 km resolution (CAM-44 and SAM-44) during the CORDEX-Phase 1 and CORDEX-CORE stages, to ~25 km (CAM-22 and SAM-22). The International Centre for Theoretical Physics (ICTP) and the Rossby Centre of the Swedish Meteorological and Hydrological Institute (SMHI) produced present and future 50 Km resolution simulations for CORDEX-CAM using RegCM and RCA regional models, respectively. Additionally, the ICTP produced the CAM-22 simulations with RegCM RCM. For the CORDEX-SAM domain, an unprecedented modeling effort developed under the auspices of an EU project allowed producing RCM simulations at 44 km resolution including more than 7 RCMs for present and future climate conditions driven by CMIP3 GCMs. Additionally, the CPTEC (INPE, Brazil) provided a 20km resolution simulation with the ETA RCM nested into three CMIP3 GCMs. On top of all these simulations, the CORDEX-CORE initiative provided the simulations produced by the REMO2019 and RegCM4 RCMs nested into three different global models from the CMIP5 ensemble.

Table 1. Dynamical RCMs (and resolution) participating in CORDEX phases for CAM and SAM domains.

Domains	CORDEX-PHASE 1	CORDEX-CORE
CAM	RegCM4, RCA	RegCM4
SAM	RCA, RegCM3, REMO, ETA, MM5, ECHAM5, LMDZ	RegCM4, REMO

Multiple analyses were performed based on the simulations available. Additionally, several training activities focused on specific regional climate phenomena were developed based on the availability of the simulations indicated above. A comprehensive list of publication can be found on the [CORDEX web page](#).

The two domains have also advanced in statistical downscaling analyses. Recently, the University of Costa Rica produced statistically downscaled monthly estimates of precipitation and temperature at 1 km horizontal resolution for the Central American countries and the Dominican Republic from 1979-2099. Several subregions (e.g. Panama Canal and selected municipalities of Costa Rica) also contain daily data, which are available for six CMIP6 GCMs and three scenarios: SSP1-2.6, SSP2-4.5 and SSP5-8.5. CORDEX-SAM has also published several studies based on statistical downscaling. These analyses mainly focused on daily maximum and minimum temperatures over Southern South America and explored different standard ESD techniques (analogues, generalized linear models, artificial neural networks and generalized linear models conditioned by weather types) from the perfect prognosis approach. The evaluations were based on perfect conditions (ERA Interim driven simulations) and projections driven by GCMs from CMIP5 and CMIP6 simulations and scenarios. In addition, deep learning-based ESD models have been tested and compared with benchmarking ESD models over Southern South America.

### **Advances in the understanding of physical processes and regional impacts**

The major scientific advances for a better understanding of physical processes include studies on the North American and South American monsoons, tropical cyclones, synoptic scale cyclones in SAM, subtropical jet streams, low-level jets, extreme events, droughts, heat waves, compound extreme events (heatwaves and droughts), seasonal circulations, present and future changes of regional climates and extremes, land use impacts, impacts of local convection (convection permitting), and role of physical parameterizations, grid size and domain size in regional processes.

Some modeling studies have focused on impacts of current and future climate change applications in different sectors, for example on viticulture and climate change in Mexico, changes in grain yields in several regions of the two domains, impact of climate change in pine distributions in Mexico, surface water budgets, global and regional droughts, and wind energy potential among others.

### **Training and capacity building**

CORDEX-CAM and CORDEX-SAM have organized training activities and special sessions in international meetings with financial support from CORDEX, ICTP, and universities of the region. Some of the activities were online and others on-site, particularly during and after the COVID pandemic. These activities have contributed to capacity building for the advancement of climate science through the participation of many scientists, particularly graduate and postgraduate students, and early career scientists of the region. CORDEX members from the two domains have also co-directed several regional climate modelling events at the ICTP, and organized sessions in the ICRC-CORDEX conferences:

- **2013:** [LAC-CORDEX](#) - 11-13th September - Lima, Peru
- **2014:** [LACII-CORDEX](#) - 7-9th April - Santo Domingo, Dominican Republic
- **2014:** RegCM4 Workshop, CICESE, Baja California México - November.
- **2016:** Third [ICRC-CORDEX 2016](#) Stockholm, Sweden (participation of domains members).
- **2016:** [RegCM4](#) - 15-19th February 2016 - Sao Paulo - Brazil - (Joint ICTP-Trieste/ICTP-SAIFR Advanced School on Regional Climate Modeling over South America). (45 participants and 9 invited speakers)
- **2016:** RegCM4 Workshop - November, University of Costa Rica.
- **2018:** [CORDEX Workshop](#) - 25-27 June, La Paz, Bolivia (30 participants from 11 countries within SAM/CAM and 10 invited speakers) -
- **2018:** [RegCM4](#) - 05-09 Nov 2018 - Sao Paulo - Brazil - meeting of FPS\_SESA - defining simulation strategies for extreme events analysis (53 participants and 16 invited speakers)
- **2018, 2020 and 2021:** Organization of Special Sessions (SE) in the Annual Meeting of the Mexican Geophysical Union in Mexico (RAUGM): Regional climate modeling and CORDEX (SE04-2017, SE05-2018, 2020, 2021), Puerto Vallarta, México - October-November.
- **2019:** Fourth [ICRC-CORDEX 2019](#) Conference in Beijing, China, October

(participation of domain members and focal points).

- **2020-2021:** During the pandemia CORDEX CAM-SAM organized two Online Writing Workshops: Nov 2020 and Apr 2021 - 4 published/2 submitted papers from this activity (42 participants and 8 invited speakers).
- **2022:** [CORDEX CAM-SAM](#), 04-06 September - Buenos Aires - (38 in person attendees + 12 remote attendees, plus invited speakers).
- **2023:** Fifth [ICRC-CORDEX 2023](#) Conference in the ICTP, Trieste. The two domains contributed with works, and organized the Flagship Pilot Studies from Southeast South America (FPS-SESA) meeting, and several sessions.

### **Km-scale modelling**

Starting in 2016, the CORDEX FPS initiative allowed the development of strategies towards km-scale regional climate modeling and ESD techniques over Southeastern South America. A collaborative team including groups from both South America and Europe created an unprecedented ensemble of km-scale 3 year-long simulations over the region that allowed improving our understanding of various climatic features occurring on the region, including the diurnal cycle of heavy rainfall events, the impact of heavy rainfall events on the hydrology of the Uruguay river basin, the impact of rainfall on crop production over southern Brazil, the representation of the urban effect on heat waves and wind intensity over several cities in Southeastern South America, among others. The main outcomes from this initiative can be also found on the [CORDEX web site](#).

### **Challenges**

SAM and CAM CORDEX domains still have many challenges; the large size of the domains and the complex terrain that dominates Latin America make some evaluation studies complicated due to the lack of sufficient observational data at fine-scale spatial resolution. From the scientific point of view, the region has not advanced in regional climate attribution studies with the exception of a couple of detection and attribution studies; the lack of fine-scale simulations in most of the two domains has hindered the advancement in convection permitting (CP) studies and the analysis of extreme events at local scale; only CORDEX-SAM have some studies on CP thanks to the collaboration in the framework of a CORDEX FPS and the collaboration with scientists from NCAR. Computational capabilities and storage also continue to be a challenge due to the lack of scientific support from the government in most of the countries.

The current Points of Contact in these domains are:

**Central America: Tereza Cavazos, Tannecia Stephenson and Hugo Hidalgo**  
**South America: Silvina Solman, Rosmeri Porfirio da Rocha and Maria Laura Bettoli**

More information on activities can be found at the CORDEX website under [Domain activities](#)

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