

WCRP CORDEX

Coordinated Regional Climate Downscaling Experiment

Report 2021-2022



Science Highlights



CORDEX simulations status

There are different views of the CORDEX CMIP6 simulations status:

- Full list of simulations
- Summary by domain
- Summary by scenario
- Summary by experiment

They are generated from [CORDEX_downscaling_status_view](#), which collects the plans from the different groups as gathered in this document.

Check out also the CORDEX CMIP6 simulations available on ESGF, either as GCM/RCM realizations by scenarios or as an interactive tool.

Coming downscalings of CMIP6 - check out the GCM/RCM overview

The CORDEX office and the SAT collected information on who will downscale what and when it will be available.

These are living documents that will be updated continuously and the were first published during 2022.

Find all you need [on GitHub](#).

CORDEX experiment design for dynamical downscaling of CMIP6

10 May 2021

The **Coordinated Regional climate Downscaling Experiment (CORDEX)** was implemented under the auspices of the World Climate Research Program (WCRP) in order to improve downscaling techniques and their use in understanding and assessing regional climate change and the provision of robust regional climate information for applications in vulnerability, impacts, and adaptation (VIA) studies. The CORDEX activity based on the downscaling of global projections from the 10th phase of the Climate Model Intercomparison Project (CMIP2) has been ongoing since 2010 ([CORDEX experiment design for dynamical downscaling of CMIP2](#)) and most comes to its end. This experiment design document presents a simulation framework for the dynamical downscaling of global climate projections from the sixth phase of CMIP ([CMIP6](#)). The general aim is to downscale a subset of climate scenarios from the CMIP6 ensemble of projections generated in [ScenarioMIP](#), and to make these downscaled regional scenarios publicly available (for more details see [Gutowski et al., 2020](#) and the [CORDEX White Paper](#)).

In addition to the continental-scale downscaling, addressed in this document, CORDEX includes some other components, for example, the [Climate Data Store](#) (CDS) and regional workshops for climate and VIA communities. CORDEX is a continuous activity that is not divided into phases (1st, 2nd, etc.) and not necessarily related to the CMIP cycles. The framework described in this document is simply referred to as CORDEX CMIP6.

Experiment protocol RCMs is published

The CORDEX experimental design for dynamical downscaling was published in May 2021 after two rounds of comments from the CORDEX community. Please find more info on the protocol [here](#) or go directly to the protocol [here](#).



Future Scientific Challenges for CORDEX; the White Papers

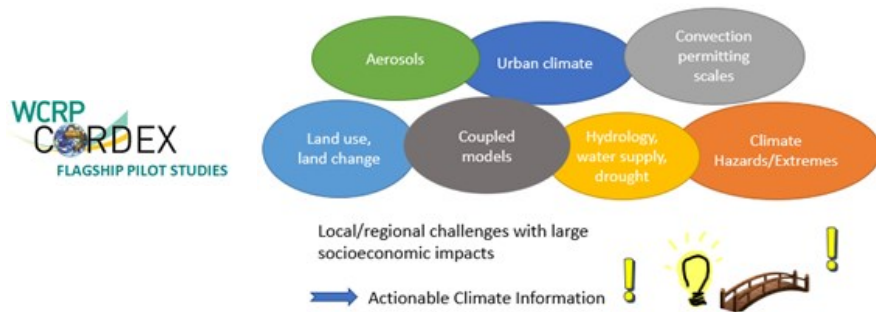
The first [CORDEX White Paper](#) on dynamical downscaling was published. Now the Science Advisory Team and the CORDEX community has also published a White Paper on statistical methods 'The Future scientific challenges for CORDEX: Empirical Statistical Downscaling (ESD)'. It was completed after several iterations in the CORDEX community. Another White Paper focusing on bridging to society will come. In the White Papers we discuss the use of various methods and how to combine them to get a more complete picture as well as possibilities and challenges ahead.



CORDEX Science Plan

During 2021 the development of CORDEX Science Plan started, building on the White Paper on dynamical downscaling and Statistical Downscaling. The focus areas to achieve the CORDEX goals include:

- Added value of downscaling: from process understanding to the provision of valuable information
- Benefits and costs of increasing models complexity
- Benefits and costs of convection-permitting models
- Assessing the role of human activity on the regional climate change signals.
- Characterizing the uncertainty of regional scale climate change signal through downscaled scenarios for multiple regions with multiple downscaling approaches



Flagship Pilot Study News

During 2021 three new Flagship Pilot Studies were endorsed:

Europe: URBan environments and Regional Climate Change (URB-RCC)

North America: Dynamical downscaling experiments and hydrological modelling for Canada and Mexico.

North America: Assessing the Use of Regional Models in a Storyline Framework for Understanding Climate Hazards

Read more about the FPS:s and their events on the CORDEX website:

[Endorsed Flagship Pilot Studies](#)

CORDEX publications

Peer reviewed publications during 2021 and 2022

[Publications 2021](#)

[Publications 2022](#)

Keep submitting your publications

Submit your CORDEX related peer reviewed publication for publication at the CORDEX website. [Use this link.](#)



Your submission will then be held for approval by the CORDEX office.

CORDEX future and Science Advisory Team (SAT)

Also during 2021 and 2022 all the SAT-meetings were held online. An extended 3-day meeting 15-17 June 2021 included more thorough discussions on the future of CORDEX, including the finalized White Paper on dynamical downscaling, the White Paper on Statistical Downscaling, the coming White Paper on the Bridge to Society, the CORDEX Science Plan, the coming/ongoing downscalings of CMIP6 and the fifth CORDEX conference; ICRC-CORDEX 2023 coming up in September 2023. The June-meeting also included an open session where Points of Contacts, Flagship Pilot PIs were invited. The open SAT meetings helps us to be transparent and to engage the community, with its expertise, in plans and activities.

Due to many changes within the WCRP, including CORDEX being incorporated as a base pillar in the new CORE project Regional Information for Society (RIfS), CORDEX SAT decided to make no changes in the SAT membership during 2021-2022.

Check out the SAT-members [here](#).

The SAT have during 2021-2022 continued to discuss [the new WCRP structure](#) and how CORDEX best works as a part of the new [WCRP home Regional Information for Society \(RIfS\)](#). Silvina Solman, one of the CORDEX co-chairs is also co-chairing the RIfS. There have also been discussions on the coordination when moving more and more into convection permitting scales and domains and event based simulations. How will CORDEX best make use of both dynamical and statistical downscaling methods and go the last mile towards actionable information in response to societal needs.

The CORDEX co-chairs and the office director continued the work in WCRP groups, meetings and discussions such as the yearly **WCRP Joint Scientific Committee Session JSC-42** and **JSC-43**



A selection of CORDEX workshops and events

As was the case during 2020, also 2021 a lot of activities were cancelled, postponed or rearranged due to Covid-19. We are very content that despite the circumstances many workshops were carried through and in November and December 2021 even two hybrid face-to-face/on-line workshops were held. During 2022 it was again possible to hold face-to-face meetings and workshops and many of the postponed activities were finally carried out, some in hybrid mood to be able to extend the number of participants. Below is a summary of a selection of the CORDEX workshops and events during these two years.

CORDEX South and Central America workshops

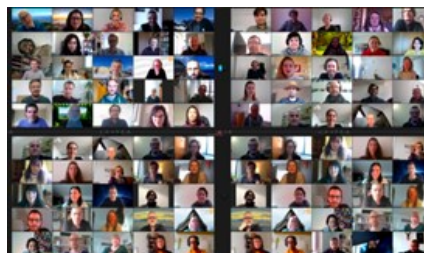
Capacity-building activities continues on/for South and Central America; in 2021 there was [The CORDEX Central America and South America Online Paper-Writing workshop](#). The workshop participants were young scientists who met online both in May and in October with the planned outcome of 8 papers. In September 2022 there were [back-to-back events on Regional](#)



Climate Modeling and Extreme Events over South America: results from the CORDEX-FPS & Parallel CORDEX CAM/SAM lab-training activity. Among the topics were to discuss status and progress of paper-writing teams as well as general.

EURO-CORDEX organized several workshops

EURO-CORDEX had Annual General Assemblies. In 2021 there were workshops on aerosol and land use forcing in CMIP6-CORDEX simulations, prioritization of the use of SSPs for downscaling CMIP6 simulations, GCM evaluation and selection and convection permitting strategy.



CORDEX SEA Outreach and Capacity Building Workshops

In November 2021 there was an online-workshop organized by the CORDEX SEA in collaboration with local organizers in Indonesia, Thailand and Malaysia and the CORDEX. 335 participants took part in the workshop and over 1000 followed on YouTube. In April 2022 it was followed up by a hybrid workshop in Bangkok on Regional Climate Downscaling and Applications with particular focus on high resolution simulations over key vulnerable areas in Southeast Asia. It also served to discuss the use of climate information for vulnerability, impact and adaptation communities, downscaling methods and urban issues. It brought together scientists, users, stakeholders, policy-makers to emphasize the importance of regional climate downscaling and information in addressing issues related to climate change and sustainability in the region.

More here:

<http://www.rucore.ru.ac.th/CORDEX-SEA-Workshop>



CORDEX Africa workshops

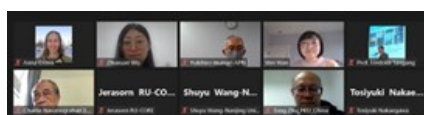
The CORDEX office at SMHI, the National Institute of Meteorology in Mozambique, the Norwegian Meteorological Institute, the University of Cape Town in South Africa and the University of Yaounde in Cameroon jointly organized a workshop in Dec 2021 that gathered thirty participants from thirteen countries. A joint Africa workshop; CORDEX Africa and the CORDEX Flagship South-East Africa Pilot Study was held in Johannesburg in April 2022 after being postponed due to Covid-19..



The purpose of these workshops was extended collaboration and to discuss the most pressing issues and gaps in climate information in order to enable well informed decisions for Africa.

<https://cordex.org/2022/03/28/cordex-workshop-for-thirteen-african-countries/>

CORDEX-MAIRS-Future Earth networking



CORDEX, MAIRS-FE and Future Earth joined forces to organize a workshop. The workshop that was held online 6,7 and 9 December 2021 focused on outlining an application to develop the framework for cooperation and networking. This includes setting up overarching topics for collaboration, capacity developing activities and exploring opportunities for a pilot study to demonstrate the benefits and use of such a framework and network. Read more about the conference [here](#).



Polar CORDEX Annual Meetings

The Polar CORDEX annual meetings include both sessions on Arctic and Antarctic research, and future plans. In 2021 the meeting was held online in October, however after two years of online meetings the Polar community members were finally able to meet in person in September 2022 at NORCE/Bjerknes Centre for Climate Research in Bergen/Norway.



Training on spatial and temporal climate change analysis using CORDEX regional climate models Bangladesh and Bhutan

Two trainings in the South Asian region took place in Dhaka, Bangladesh, 13-15 December 2021 and [Nagarkot, Nepal, 19-23 December 2022](#). This was the third and fourth in the series of training organized in 2020–2022 to build the capacities of individuals at targeted institutions, developing their skills and knowledge to analyse climate projections and produce information products for use in different sectoral applications.



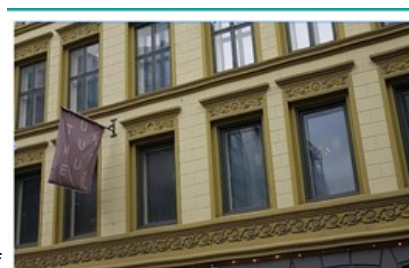
Storylines from regional simulation

The North American CORDEX Program in partnership with Ouranos, the National Center for Atmosphere Research, Iowa State University, and Cornell University held a 3-day online workshop on 25-27 April 2022. The goal of this workshop was to develop a clear synthesis of the current status of storyline research, provide tangible examples of the use of storylines and to illustrate the symbioses with alternative methods of producing applications-relevant climate projections. To advance the understanding and applications of storylines obtained from regional downscaling was also part of the workshop.



Workshop on consolidating downscaling for the provision of regional climate information to society – Cordex Consolidate

The [workshop](#) was held 11-13 October 2022 in Oslo, Norway. It was an overview of CORDEX and WCRP and their directions –



Workshop on Consolidating downscaling for the provision of regional

how can we lower the threshold for using downscaled results in climate adaptation work?

Australasia

CORDEX Australasia had a whole session on downscaling and CORDEX at the Asia Oceania Geosciences Society in August <https://www.asiaoceania.org/aogs2022/public.asp?page=home.asp>



CORDEX Africa podcast

The Climate System Analysis Group (CSAG) at the University of Cape Town has started a podcast called Climate Frontiers. The third episode, guided by Dr Chris Lennard and published in July 2021, focused on CORDEX Africa and how it has developed during the last decade.

Please find more information and the link to listen [here](#).



Some highlights from the [domain reports 2021](#) and [2022](#)

- Central America: Papers were published in Climate Dynamics on the Special issue on CORDEX-CORE. Implemented a bias-corrected version of the statistical downscaling method (MARS) for CORDEX-CORE.