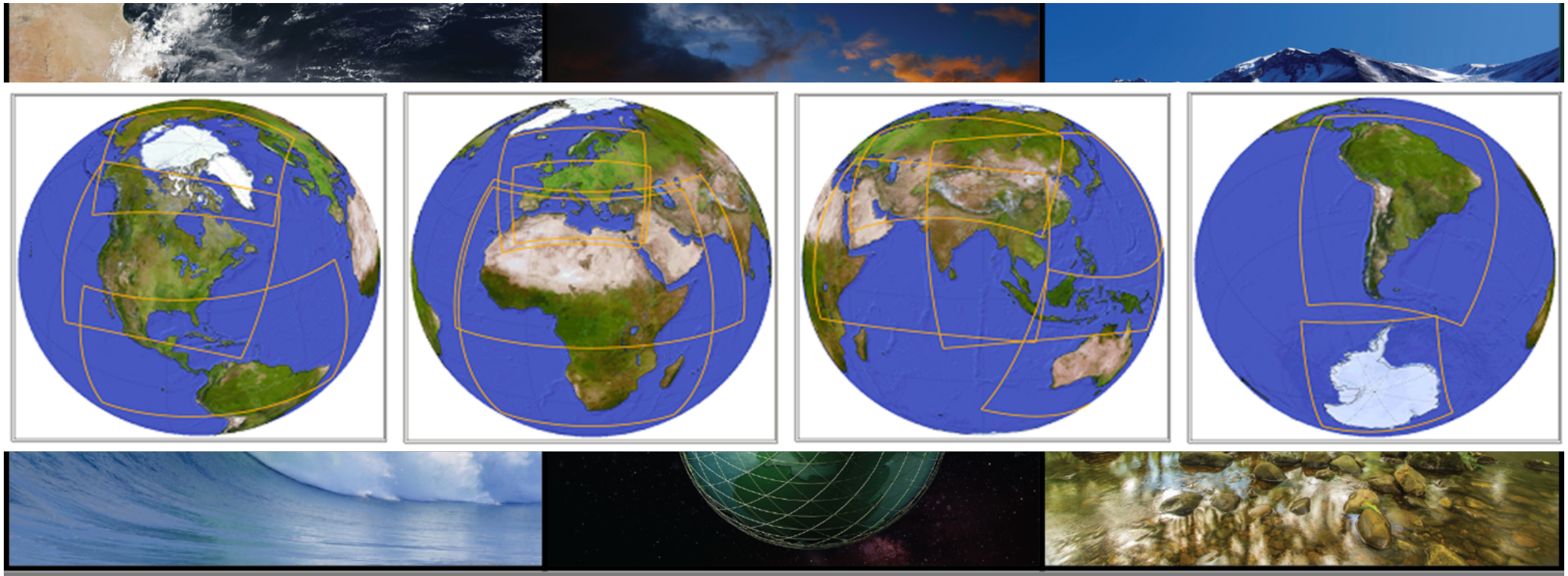

Coordinated Regional Downscaling Experiment (CORDEX)

Daniela Jacob and Silvina Solman
CORDEX-SAT Co-Chairs

42nd Session of the WCRP Joint Scientific Committee (JSC42)
June 29, 2021

WCRP CORDEX
www.cordex.org

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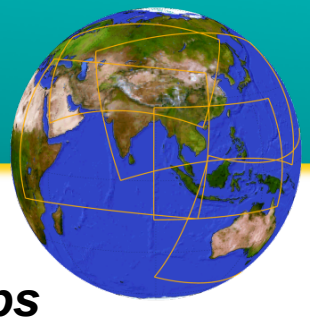
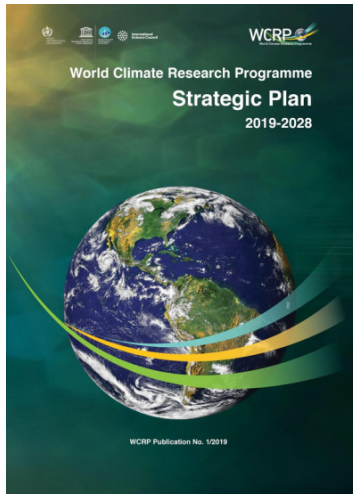
CORDEX // Overview



The CORDEX vision is to advance and coordinate the science and application of regional climate downscaling through global partnerships

Goals:

- To better understand relevant regional/local climate phenomena, their variability and changes, through downscaling
- To evaluate and improve regional climate downscaling models and techniques
- To produce coordinated sets of regional downscaled projections worldwide
- To foster communication and knowledge exchange with users of regional climate information



CORDEX & WCRP

CORDEX directly contributes to the new WCRP strategic plan, especially Pillar 4: *"Bridging climate science and society"*

CORDEX is an instrumental part of the new WCRP Home: *Regional Information for Society (RifS)*

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CORDEX // Structure

CORDEX includes 14 domains, regions for which regional downscaling is taking place and which have an official CORDEX designation.

CORDEX Science Advisory Team (SAT)

- 12 members with Daniela Jacob and Silvina Solman as co-chairs
- Report regularly at the JSC and the Working Group on Regional Climate (WGRC) meetings on the progress of its activities. Members are appointed for a 4-year term, with the possibility of 2-year extensions.

CORDEX Points of Contacts (POCs)

- 44 members
- Reports annually to the SAT and CORDEX Project Office on current and future activities

CORDEX International Project Office (IPO)

- The IPO for CORDEX (IPOC) is hosted by SMHI with Iréne Lake as the director

Highlights: CORDEX and Society
Supporting the development of National Adaptation Plans

CORDEX can provide robust information to inform applications & decision making

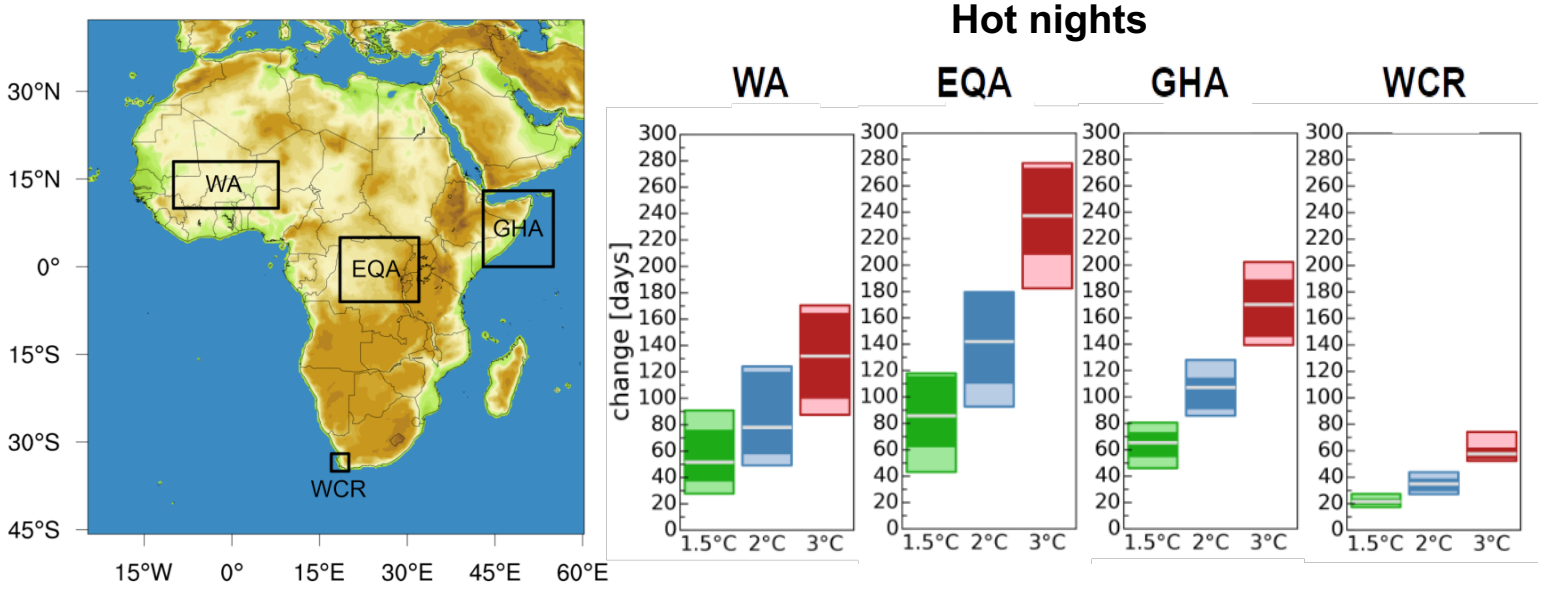
CORDEX products can inform NAPs

CORDEX-CORE

Covers all land regions around the world
25x25km grid size
RCP2.6 & RCP8.5
1970-2100

➔ Particularly interesting for developing nations

Example of analysis CORDEX climate data in Africa



The colours of the boxes: 1.5°C (green), 2°C (blue), 3°C (red) global warming scenario.
Ensemble minimum/maximum (light colour), 17th and 83th percentile (dark colour) and median (grey) as field means for focus regions d) West Africa, e) Equatorial Africa, f) Greater Horn of Africa, g) Western Cape Region.

WCRP CORDEX

Weber et al., 2018, https://doi.org/10.1002/2017EF000714

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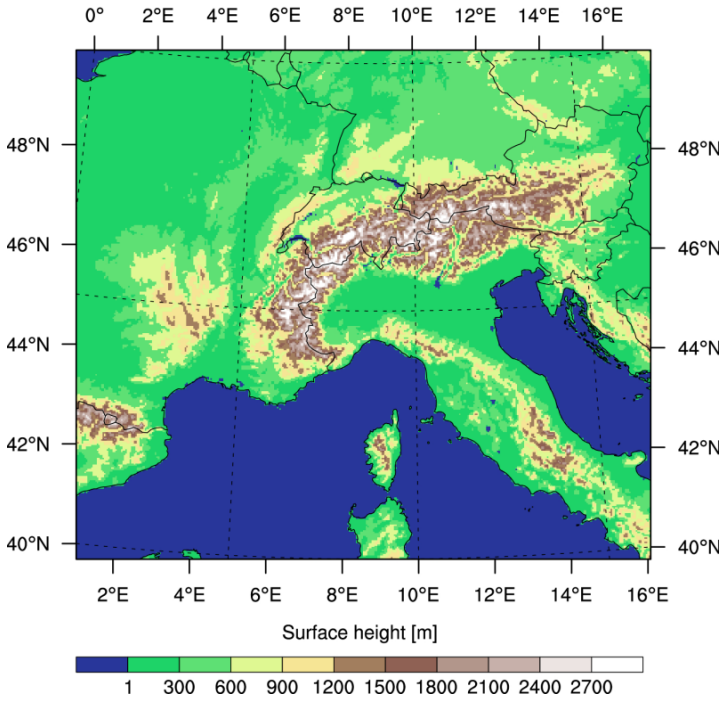
Highlight: high-resolution (3km)

CORDEX-Flagship Pilot Study

Convection over Europe and the Mediterranean

Model domain

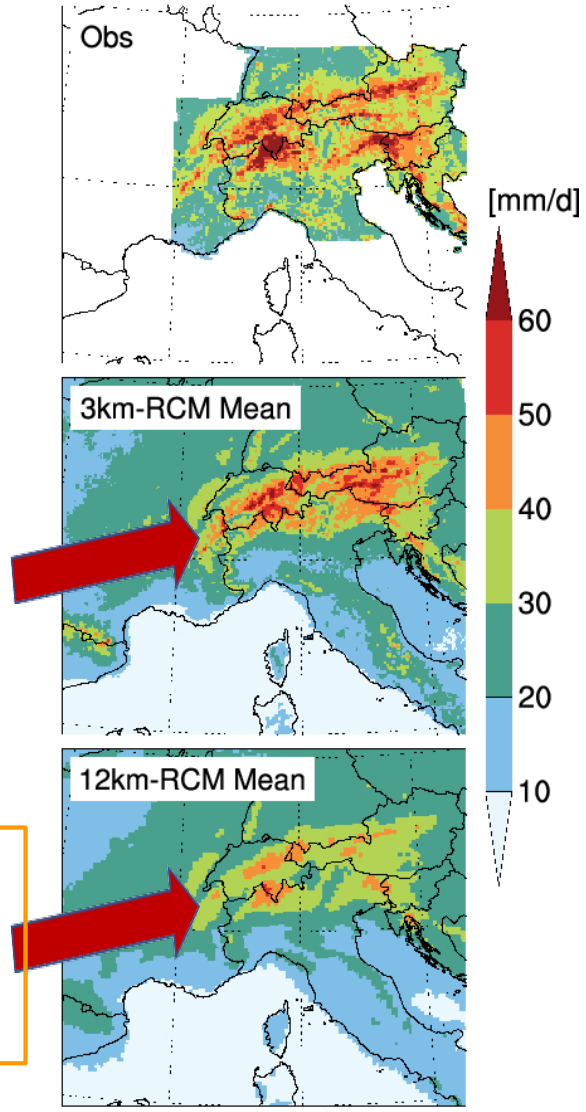


23-member ensemble

- Reduces biases & uncertainty ranges;
- Improves diurnal cycles;
- Mitigates the “drizzle” problem;
- Captures heavy precipitation

Clear improvement in heavy precipitation (P99)

More realistic representation of precipitation with convection-permitting models compared to coarser counterparts



Ban et al. 2021
https://link.springer.com/article/10.1007%2Fs00382-021-05657-4

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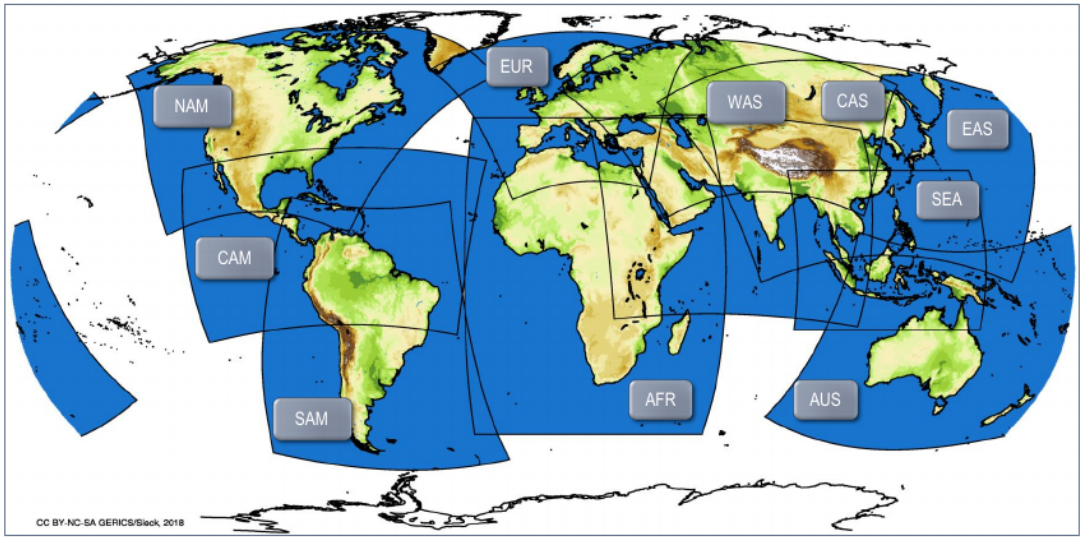
CORDEX data availability (input for AR6 chap/atlas)

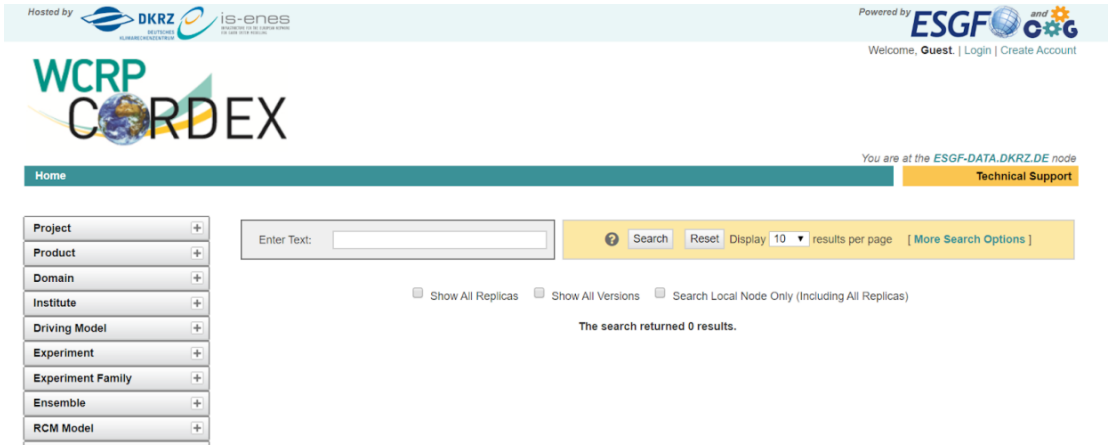
- Open access
- Standardized, quality controlled
- Observational basis for verification
- Community effort
- Inventory of GCM/RCMs on www.cordex.org

CORDEX-CORE Regions/Domains



CORDEX model output data is available online via:

- Earth System Grid Federation
- Copernicus Climate Data Store



ESGF

Climate Data Store (CDS)
Climate data at your fingertips

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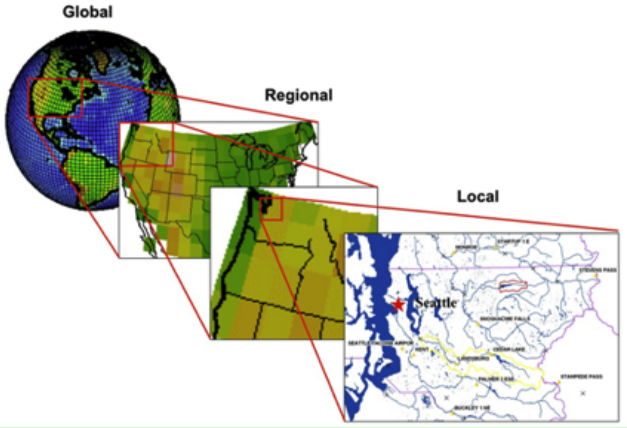
CORDEX // primary science issues



CORDEX White Paper (some challenges)

- Convection permitting resolution to inform risks/VIACS
- RESMs to include human dimension
- Handle increasing data amounts
- 'Merge' Dyn. downscling with ESD

In development:

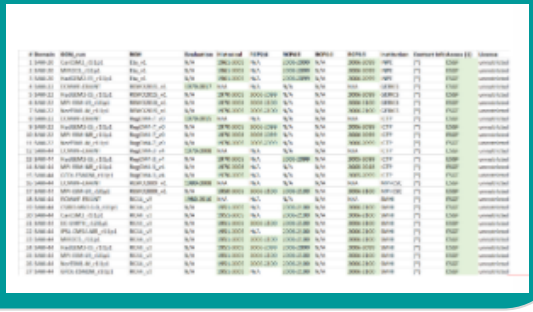
- **ESD paper (from large-scale GCM to predictors observations; bias adjustment; pseudo-observations and emulators)**
- **Science Plan**

WCRP CORDEX
FLAGSHIP PILOT STUDIES

Flagship Pilot Studies

- Regional-to-local extremes
- Third pole region
- Convection permitting
- Land use change
- Urban areas
- Aerosols

CMIP6 Downscaling protocol



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CORDEX // WCRP Partnerships

- Fundamental Science/understanding and long-term response:
  LHA My Climate Risk, Digital Earths

- Transdisciplinary Engagement:
  LHA Safe landing and LHA Academy.

- Envisaged strong partnership with the Earth System Modelling and Observations new core project

- New core project:
  RIfS lead and contribution to development of Science Plan and Building Blocks

CORDEX contributions to RIfS

CORDEX is a central pillar in providing inputs to the overarching questions and contributes to the RIfS agenda in several research questions including:

- Specific FPSs dedicated to improve our understanding of local/regional climate phenomena for specific regions
- Identifying key regional mechanisms and modelling challenges
- Improvements on regional climate modelling strategies
- Improvements on ESD tools
- Experience gained through the dialogue with stakeholders
- Downscaling protocols to build coordinated modelling approaches
- Capacity building and training activities
- Knowledge gaps identified in CORDEX that may help developing RIfS:
  Catalogue of drivers of climate change at the regional scales that need further WCRP research

WCRP Coordination Office for Regional Activities (CORA)

Hosted by GERICS, Germany & Bjerknes Centre for Climate Research, Norway

Period: 2019-2021. Resources: 2,5 person-yrs

(Armelle Remedio & Anke Schluensen-Rico- GERICS, and Beatriz Balino- Bjerknes)

Activities report Jan-June 2021

- Core Project Regional Information for Society (RifS) - assistance to the RifS Interim Coordination Group (ICG), WG on Building Blocks, and WG on Governance for the coordination and development of the RifS Science Plan, governance structure, strategic goals and partnerships.
- Regional Consultations: assistance to H. Cleugh in the organisation and logistics of the *Regional Climate Forums* in Southeast Asia, North/Central Americas, Caribbean and Greenland and Europe & Western Asia.

Planned activities July-December 2021

- CORA will continue to assist in the implementation of RifS and in the planned *Regional Climate Forums* in Africa and South America.
- The office will be closed 31 December 2021.

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WCRP Coordination Office for Regional Activities (CORA)
RifS appendix

Support in logistics, communication and documentation throughout RifS' set-up process

1. Videoconferences

- First overarching open access meeting with more than 50 participants
- 11 RifS planning meetings since the end of April
- More than 10 internal Building Blocks meetings on the preparation of the Science Plan.

CORA assisted all 4 Building Blocks.

2. RifS' contact database

Structure divided into global, ICG, WG on Building Blocks and WG on Governance

3. Interim Coordination Group

Support throughout the selection process

4. Working Group on Building Blocks

Support in the formation of the four groups

5. Common channel and platform

Set up of a fast communication channel and a google drive with access to RifS documents


Thank You
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www.cordex.org
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World Climate Research Programme
WORLD METEOROLOGICAL ORGANIZATION
United Nations Educational, Scientific and Cultural Organization
Intergovernmental Oceanographic Commission
International Science Council