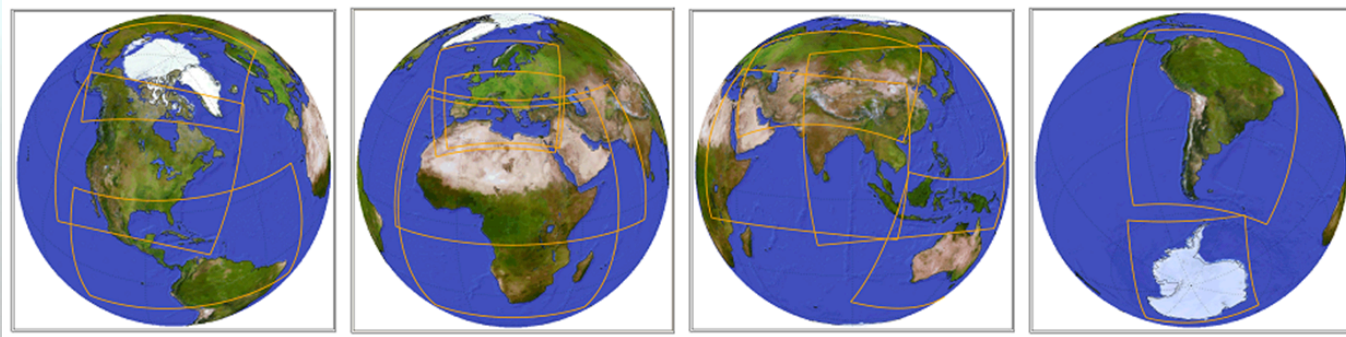


Coordinated Regional Climate Downscaling Experiment (CORDEX) – Recent Highlights



- Arctic CORDEX
- North America CORDEX
- Central America CORDEX

- EURO-CORDEX
- MED-CORDEX
- CORDEX Africa
- MENA-CORDEX

- Central Asia CORDEX
- South Asia CORDEX
- East Asia CORDEX
- South East Asia CORDEX
- Australasia CORDEX

- South America CORDEX
- CORDEX Antarctica

WCRP New Strategy

New strategic vision

A world that uses relevant and authoritative climate science to ensure a resilient present and sustainable future for humankind

- Support wise mitigation and adaptation choices
- Seamless time/spatial scales, earth system models, harmonizing atm/climate/capacity building/models

**Research in a new, broader
“operational/service/policy/
sustainability” landscape where
societal needs are evolving**



CORDEX - further interactions with WCRP activities

CLiC

SPARC

CLIVAR

GEWEX

GFCS, WGCM, WWRP, CMIP/HighResMIP, GAW...

**New CORDEX SAT co-chair:
Silvina Solman
Bill Gutowski rotating off
next year**

**New Joint WCRP Coordination
Office for Regional Activities: WCRP
CORA**

Jointly hosted by the
[Climate Service Center Germany
\(GERICS\)](#) in Hamburg, Germany,
and the
[Bjerknes Centre for Climate
Research \(BCCR\)](#) in Bergen, Norway.

Implementation? - Scoping a Framework for WCRP Regional Activities

“Leg 1” Foundational Climate Science

Curiosity-driven research/ Fundamental knowledge

“Leg 2” Application-inspired Climate Science

- Use-inspired fundamental research
- Understand critical phenomena, processes governing climate relevant to users

“Leg 3” Trans-disciplinary Engagement

- Dialogue with “boundary” organizations
- ‘Translational science’
- Goal: Provide climate information, not numbers

WCRP Regional Activities

“Leg 1” Foundational Climate Science

Curiosity-driven research/ Fundamental knowledge

**CORDEX primarily
in Leg 1? CORDEX FPS
CORDEX – GCs, CMIP...**



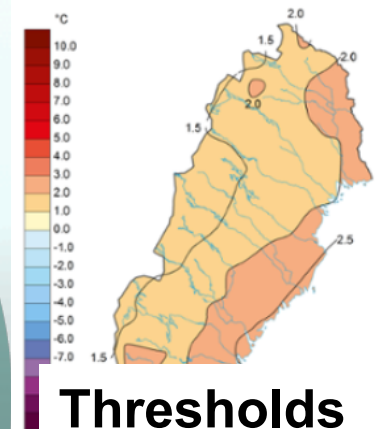
Regional climate hotspots



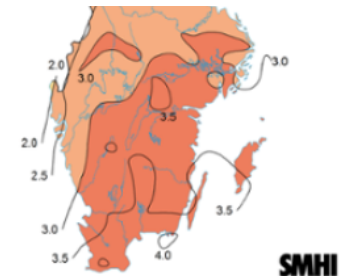
Heat wave in India is literally melting
48 °C / 118 °F. imgur.com/gallery/txs



Extreme events



Thresholds



Medeltemperatures avvikelse
från den normala, sommaren
2018.

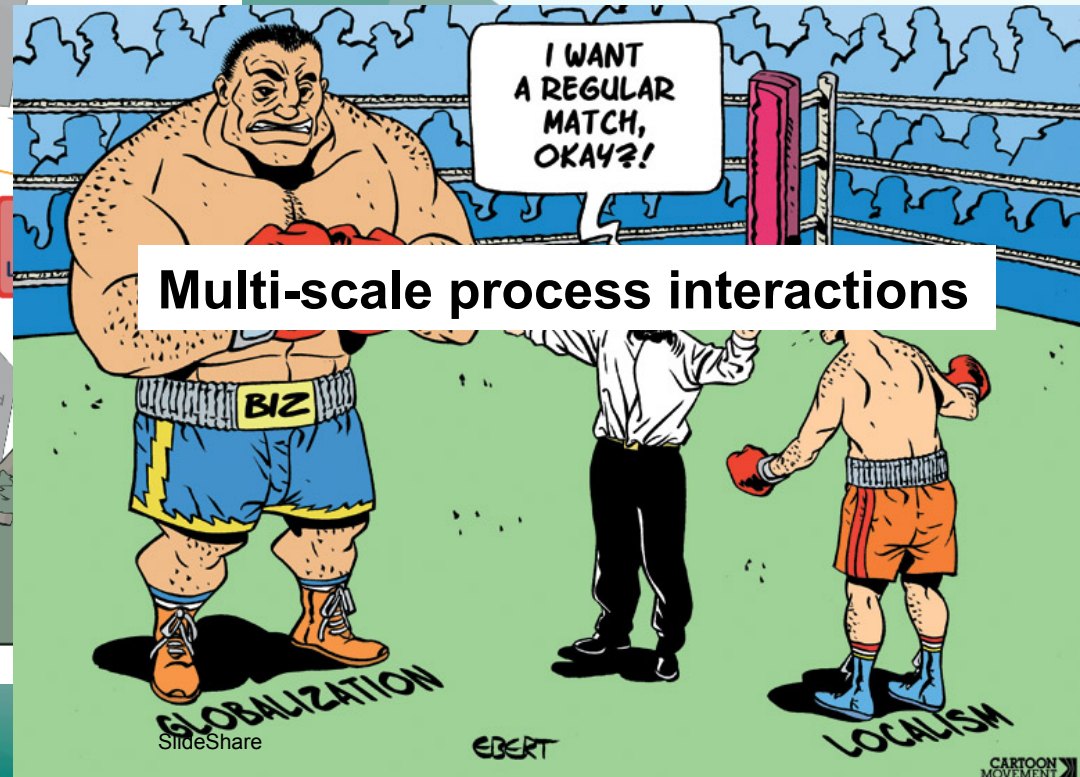
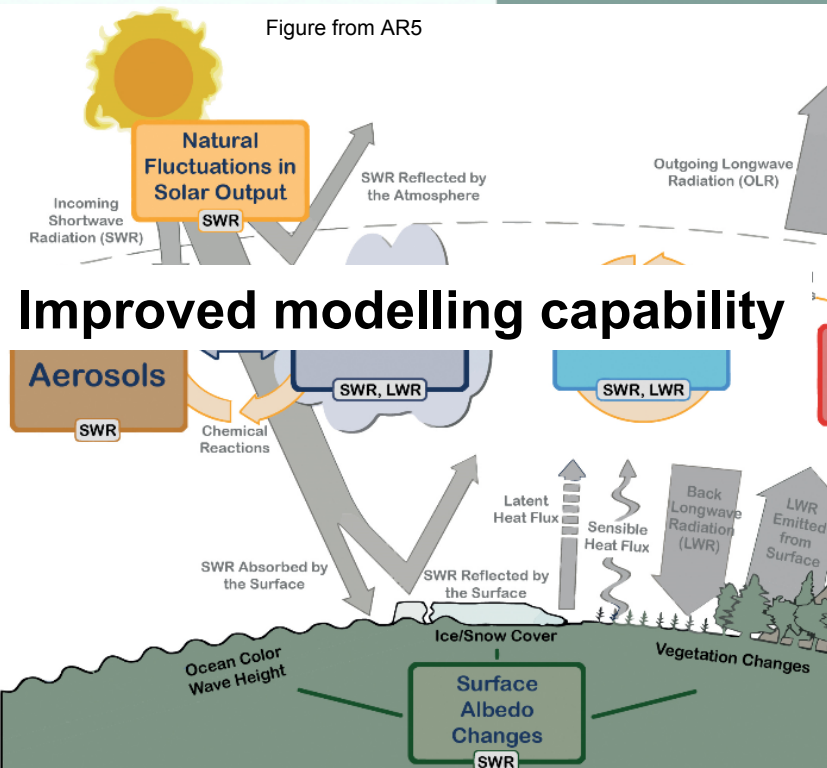
WCRP Regional Activities

“Leg 2” Application-inspired Climate Science

- Use-inspired fundamental research
- Understand critical phenomena, processes governing climate relevant to users

CORDEX – WWRP, ...

Figure from AR5



Multi-scale process interactions

WCRP Regional Activities

“Leg 3” Trans-disciplinary Engagement

- Dialogue with “boundary” organizations
- ‘Translational science’
- Goal: Provide climate information, not numbers

**CORDEX - obs4MIPs,
UNFCCC, GFCS, FE,
WMO, VIA...**

CORDEX Partnering Activities

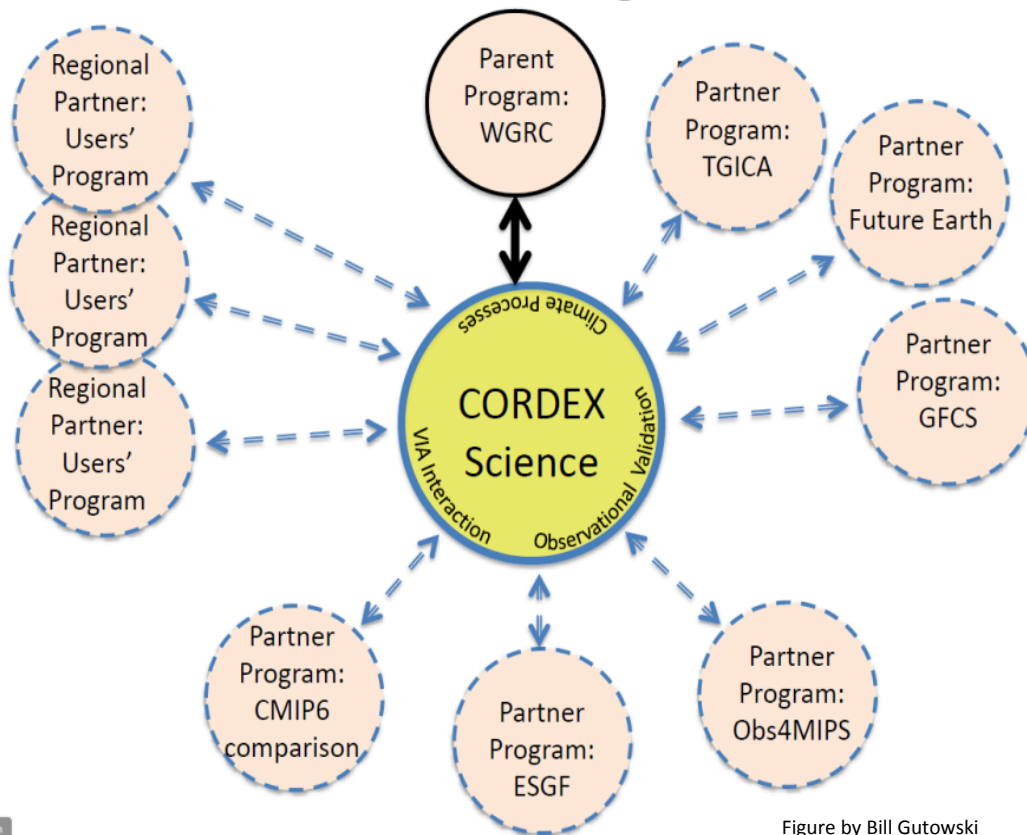
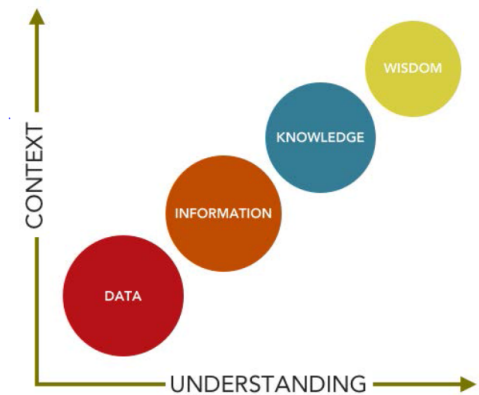


Figure by Bill Gutowski

Data or information?



Courtesy of Felipe Lucio

CORDEX Coordinated Output for Regional Evaluations (CORE)



Motivated/promoted by:

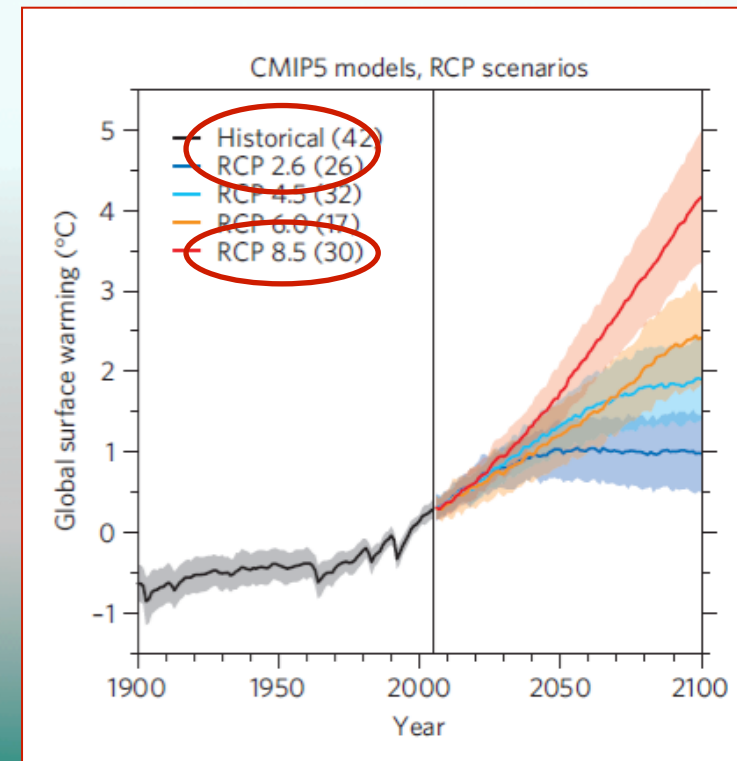
- IPCC workshop on regional climate
- WCRP Scoping Workshop on a framework for reg. studies (CORDEX reps)
- Regional focus in AR6 WGI (3 chapters + Atlas)

- 3- 5 GCMS, (best) /domain
high-, middle- and low- climate change
(temp)

ESD, all-regions comparative analysis?

CORE Atlas - resolution?

Foundation for additional work by others



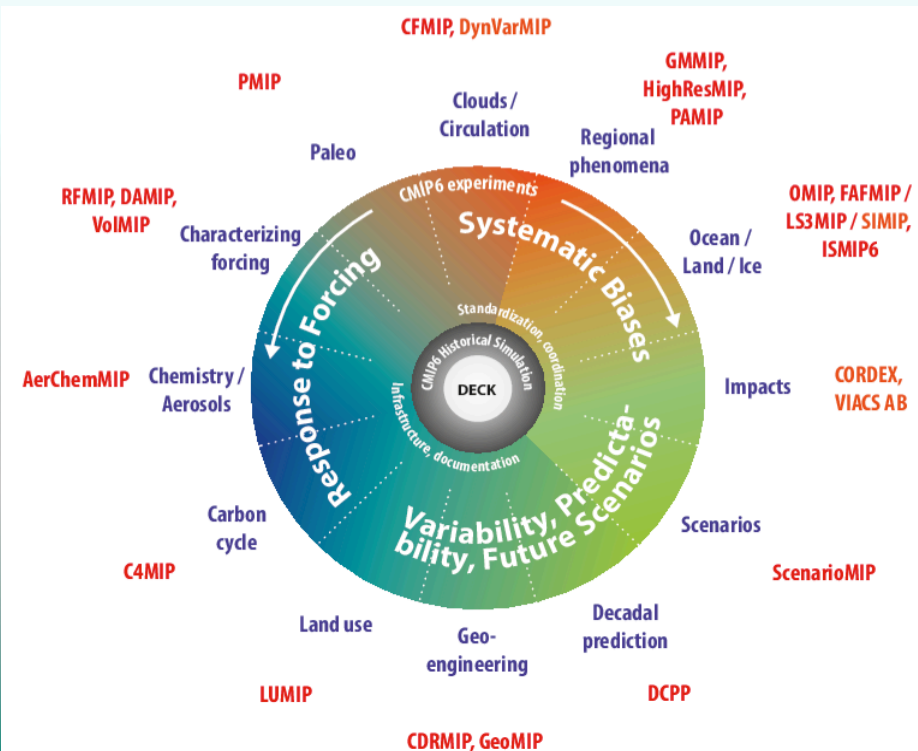
Preparing for CMIP6

Adressing WCRP Grand Challenges:

1. Weather and Climate Extremes
2. Regional climate information (or further developments)

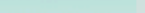
CORDEX:

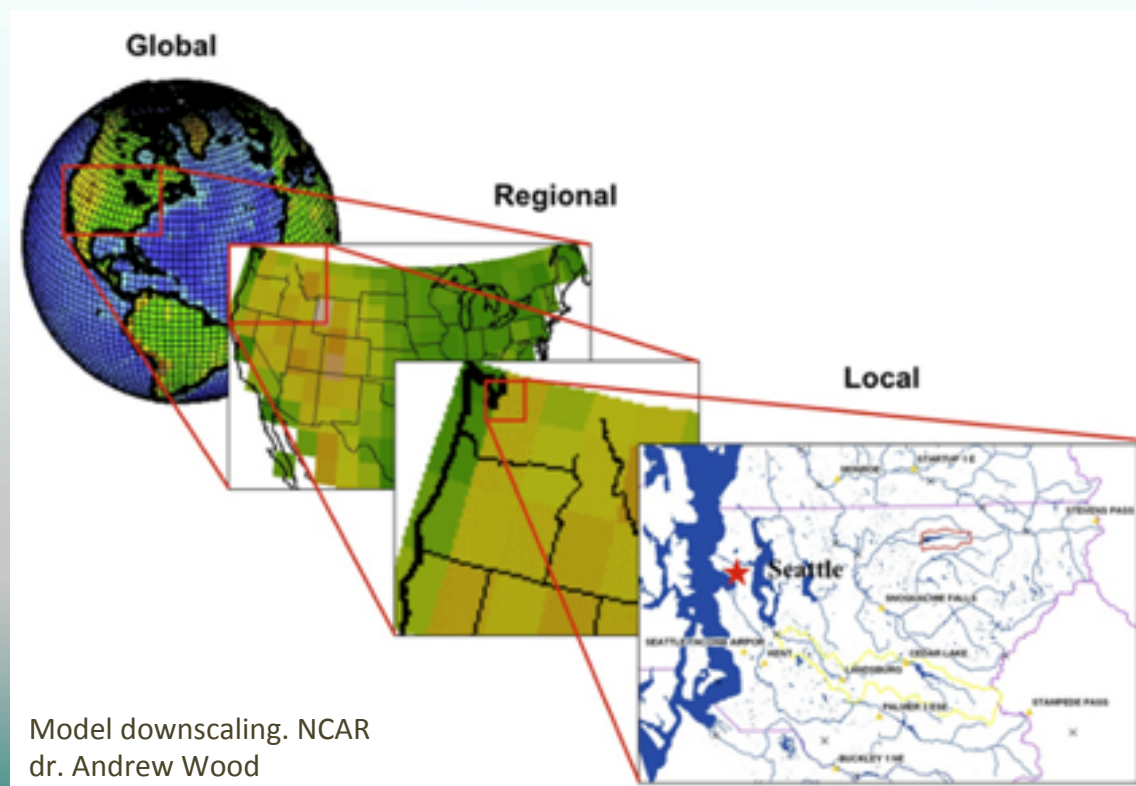
Coordinate with: ScenarioMIP, HighResMIP, VIACS AB (Vulnerability, Impacts, Adaptation and Climate Services Advisory Board) , . . .



CORDEX Scientific Challenges > Flagship Pilot Studies (FPS)

Focused activities transferrable to other regions
Cooperation domains and VIA communities

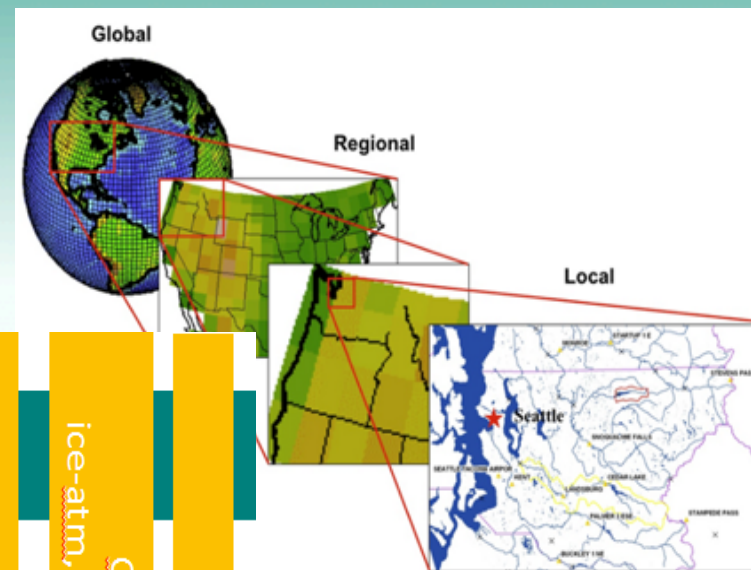
 **Advance science and application of regional climate downscaling, for improved regional climate information**



CORDEX Scientific Challenges > FPS

Focus, transfer, cooperate

Potential contribution/collaboration with Regional Hydroclimatology Projects (endorsed by GEWEX)



Cities (effects of climate change, heat islands, LULC, bridging with urban parameterization community)

Wind energy (wind-farm feedbacks, sfc winds, PBL)

Inland waters (large lakes) and regional seas

Small Islands (island-generated climatology, storm surge)

Organized convective systems (coastal storm systems, tropical storms, mesoscale convective systems)

High mountain environments (glaciers, snow...)

Added Value (variability / as a function of scales, biases/uncertainties, ESD, user metrics)

Human factor / VIA issues

Convection-permitting Modelling

Coupled Models (ocean-ice-atm, lakes, carbon cycle, aerosols...)

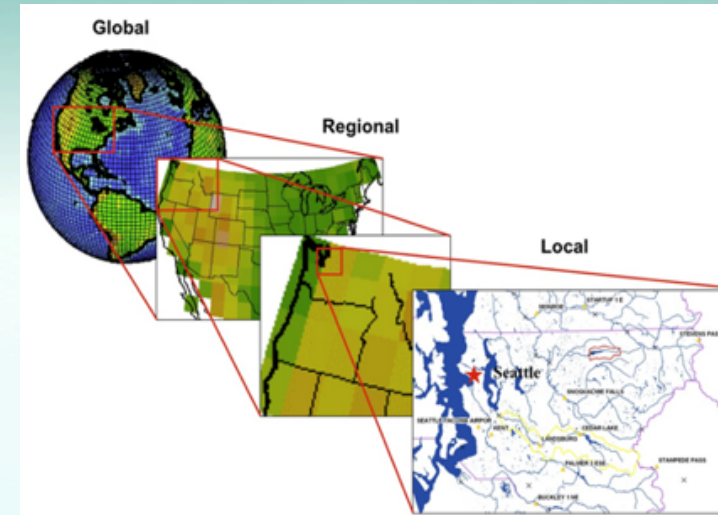
Capacity building

Focus, transfer, cooperate

**Fine-scale processes
important to region's
climate (physical basis),
added value of
downscaling, uncertainties**

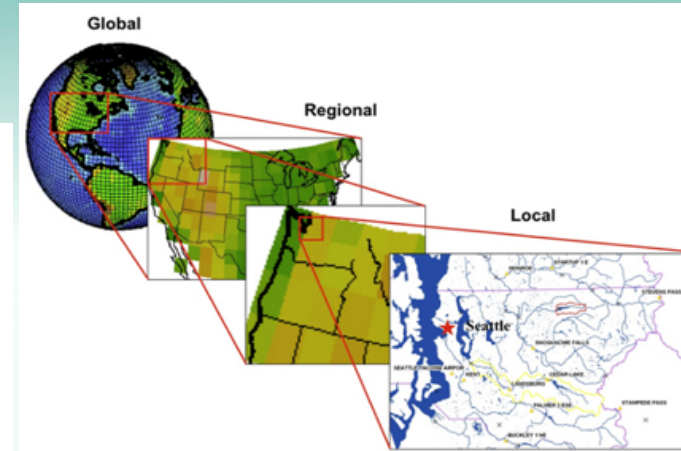
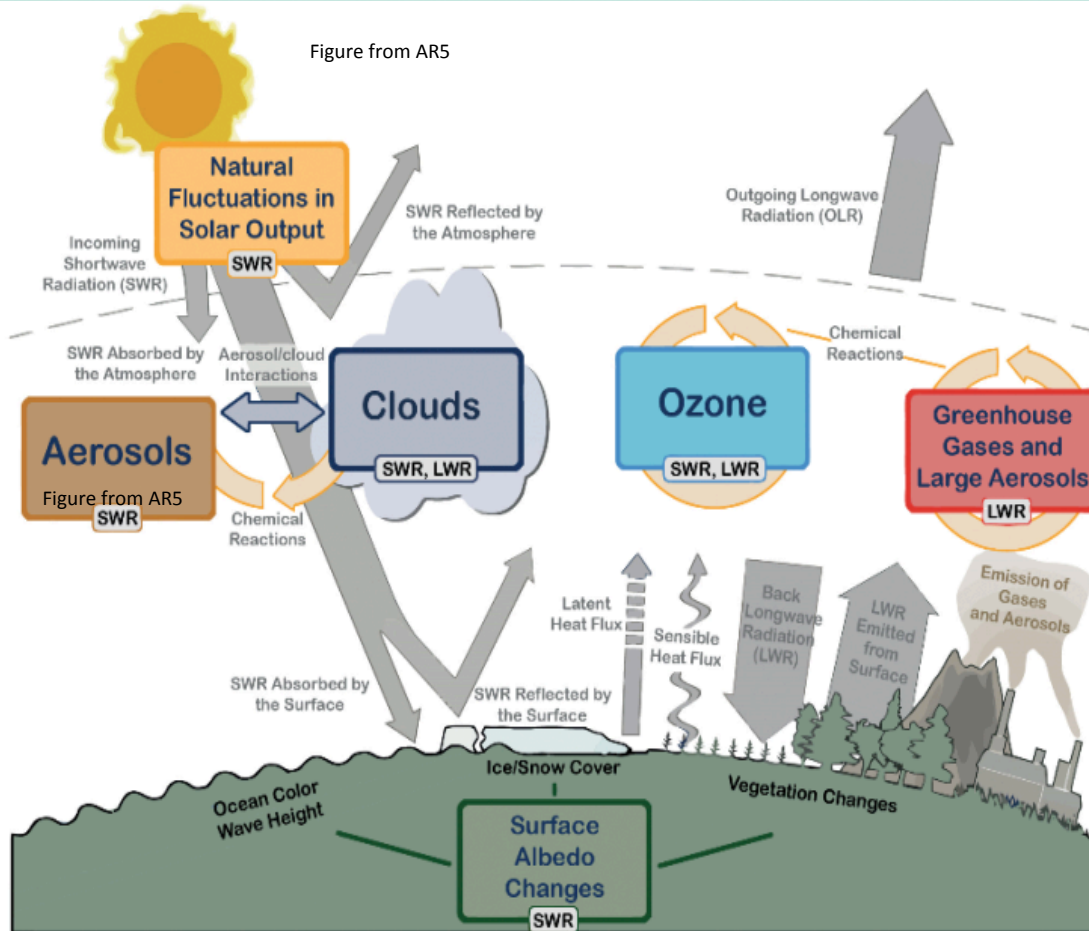


https://upload.wikimedia.org/wikipedia/commons/8/80/Cobbles_Nash_Point.jpg



CORDEX Scientific Challenges > FPS

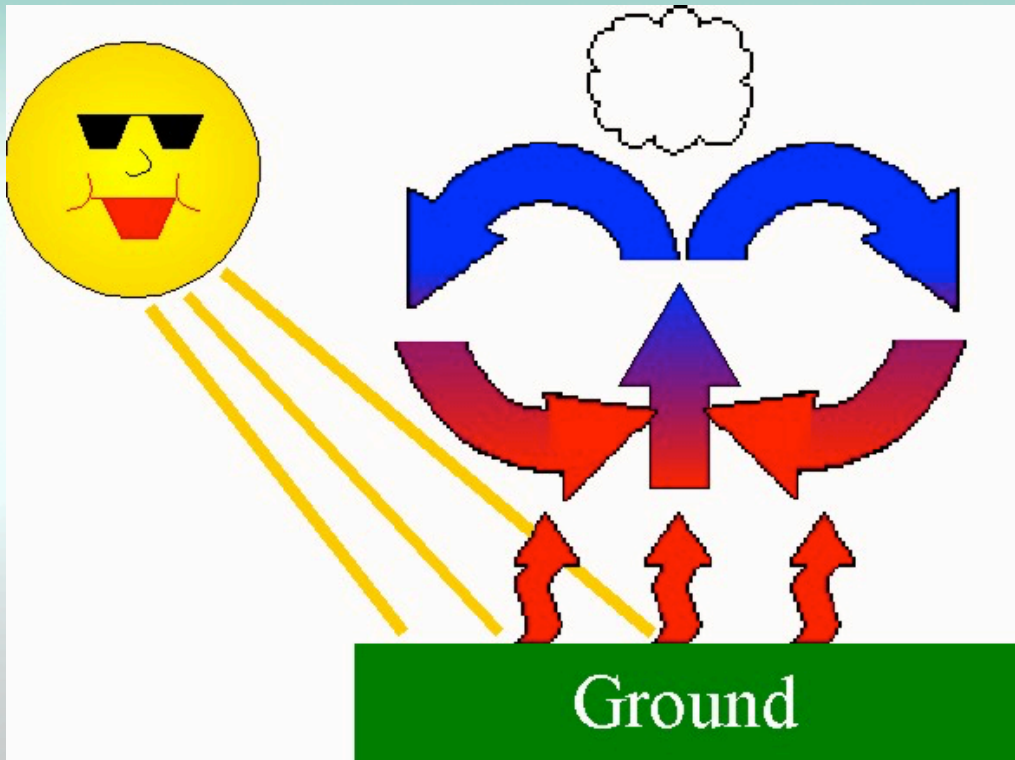
Focus, transfer, cooperate



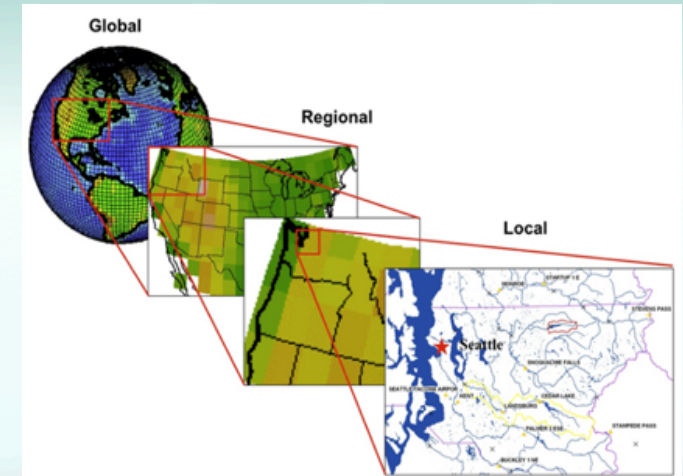
Coordinate regional processes/coupled models

CORDEX Scientific Challenges > FPS

Focus, transfer, cooperate



<https://www.esrl.noaa.gov/psd/outreach/education/science/convection/Sky.html>



**Convective systems;
monsoons, precipitation,...**

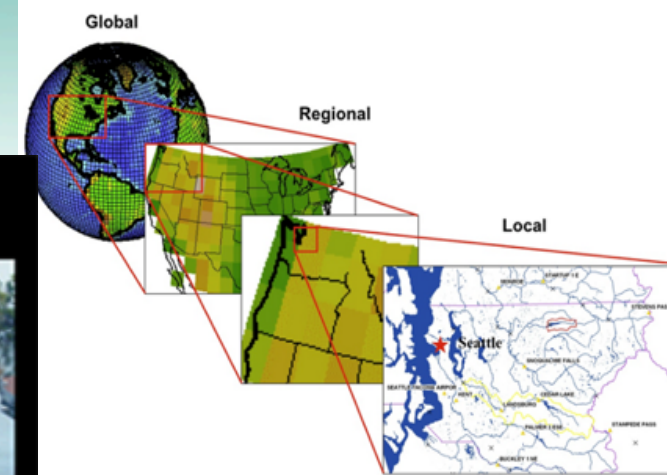
CORDEX Scientific Challenges > FPS

Focus, transfer, cooperate

WWW.THISISCLIMATECHANGE.ORG



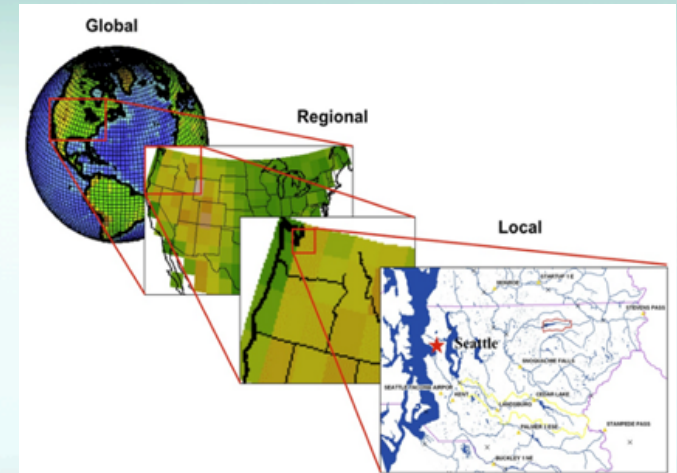
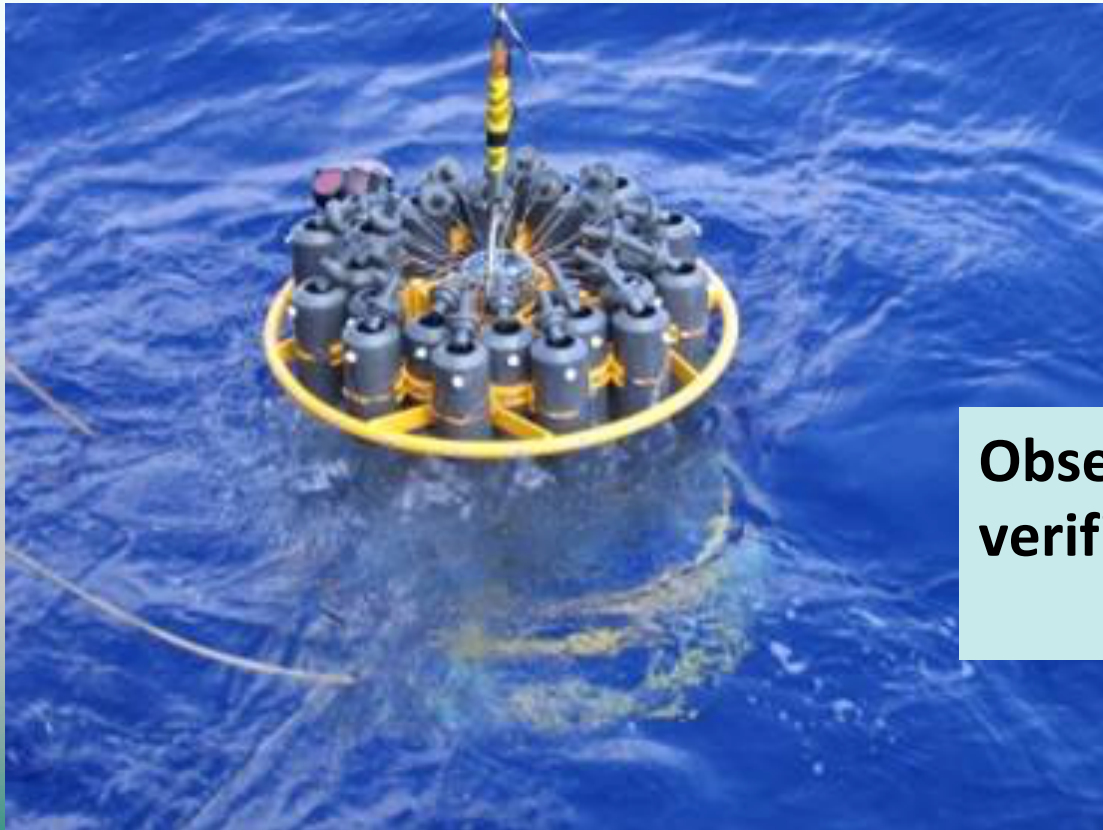
EXTREME WEATHER



Human element (land use –
droughts, coastal issues – floods...)
User applications (VIA basis)

CORDEX Scientific Challenges > FPS

Focus, transfer, cooperate



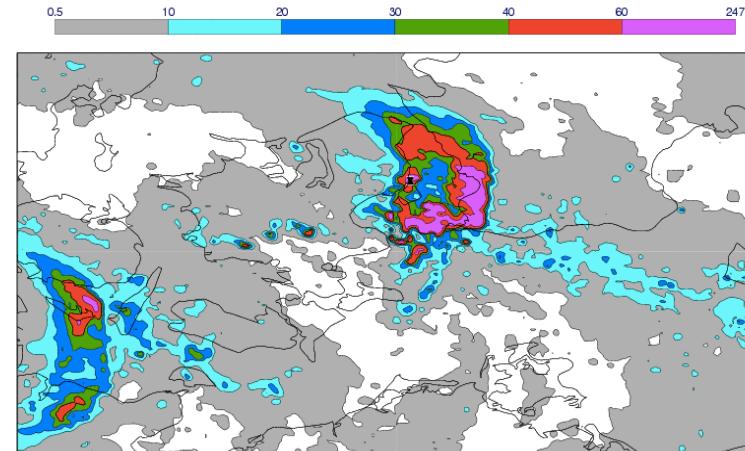
**Observational basis for
verification (analysis basis)**

Extreme precipitation events in Southeastern South America: a proposal for a better understanding and modeling

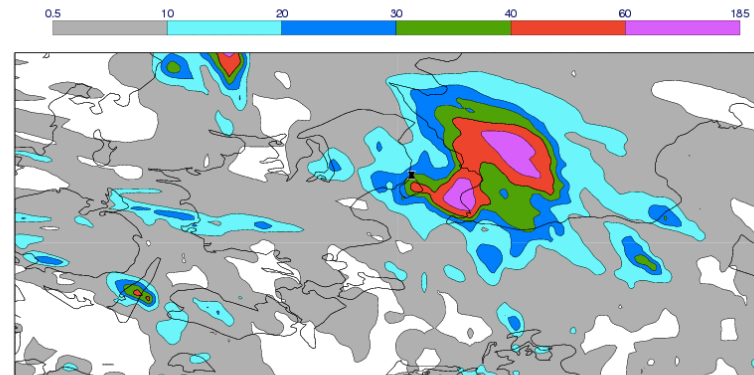
ELVIC – Climate Extremes in the Lake Victoria Basin

Convective phenomena at high resolution over Europe and the Mediterranean

Precip Radar



**Forecast HARMONIE (NWP)
(2.5 km)**



Kjellström et al., GEWEX Newsletter (2014)

Other recent/ongoing activities

Input to IPCC reports and to organizing and scheduling future work of the IPCC



ipcc
INTERGOVERNMENTAL PANEL ON climate change



Cooperation with Green Climate Fund, growing demand for information from SMHI/CORDEX!!



**GREEN
CLIMATE
FUND**

Other recent/ongoing activities



CORDEX Africa Analysis Campaign, health projects -train young climate scientists, engage users. Papers in the IPCC SR15. Further funding?

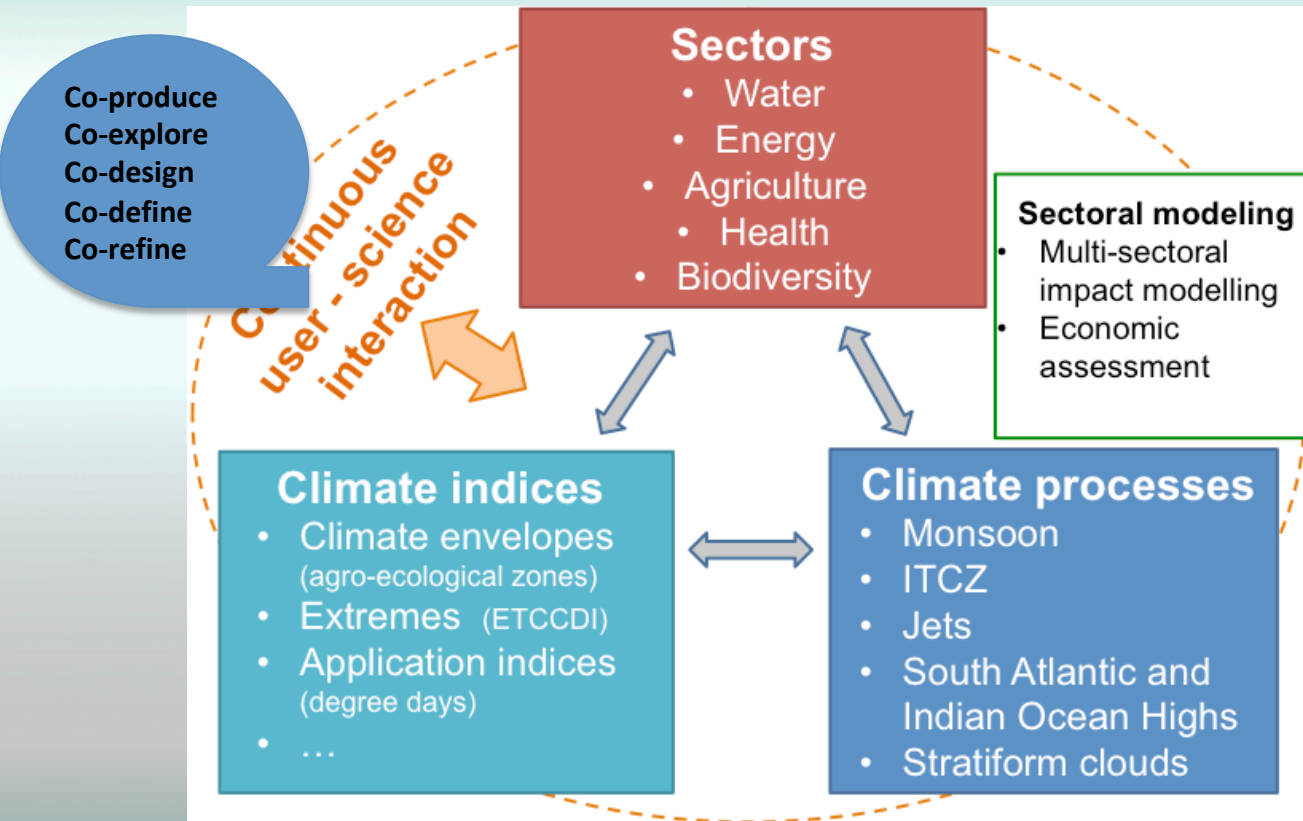
Contributions to climate information/assessment reports



CORDEX demonstrator

Adapt to climate change? African Impact Atlas: impacts in Africa under different degrees of warming. Threshold exceedance in key sectors.

Analysis approach



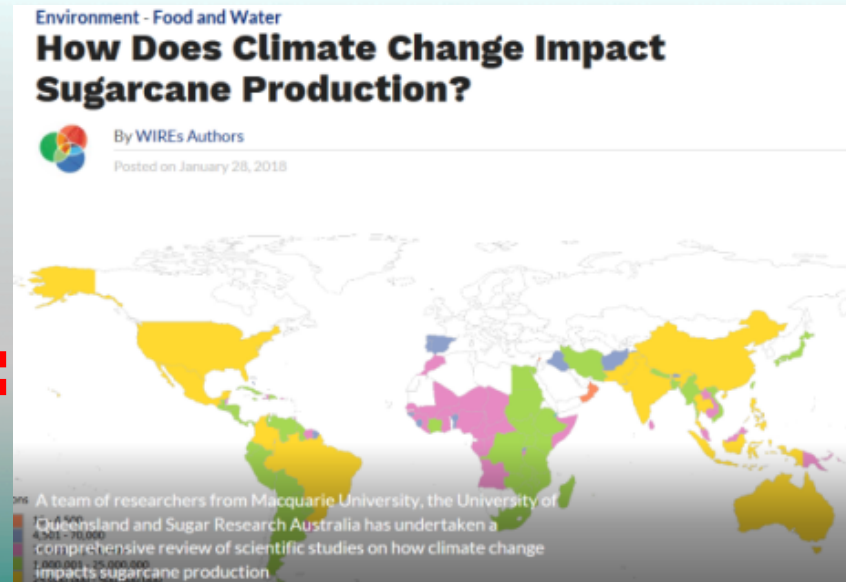
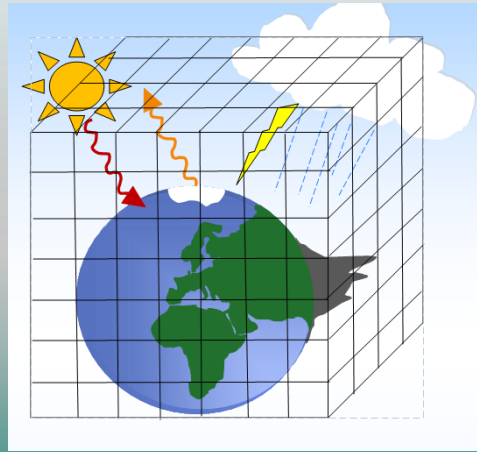
Regional expertise essential to develop this information > good links between African and other institutions



So – what to whom?

Adequate climate information communicated in an understandable and usable way to;

- Water managers
- City planners
- Forest owners
- Farmers



Objectives/priorities

- **Bring community together!**
- **Added value of regional /local models/downscaling + uncertainties/biases, high mountain environments...**
- **Coupled models – inland waters/regional seas, ocean/ice, carbon cycle/aerosols**
- **Vulnerability, Impacts, Adaptation – food baskets, water resources, power generation implications, glacier retreat/sea level rise, land use/change, heat islands**
- **Capacity building, Training, tools and methods, sharing knowledge**
- **ECS-event, YESS representatives, supporting developing country young scientists**

<http://icrc-cordex2019.cordex.org/>

Opportunities:

- 1. Discussion of new strategic plan**
- 2. Input on implementation plan**

- Cooperation on session co-chairing**
- Session topic formulation**
- D-sessions on specific regional issues; Himalay/TP - high resolution simulation/reanalysis and its implication/application, Regional responses to global warmings of 1.5 and 2C, climate adaptation/ services**
- FPS on TP/Himalaya?**
- Regular presentations**

CORDEX Way Forward

- **White paper on Future Directions of CORDEX with focus on:**
 - **Coordination of convection permitting simulations**
 - **Added value of downscaling**
 - **Availability of CORDEX modelling outputs to the community**
 - **Modelling strategies**
- **Adaptation to the new WCRP Strategic Plan**

BRANCO *ComicallyIncorrect.com*
©2013 2011 REVISED



THANK YOU!

Other recent/ongoing activities

Workshops, writeshops



Klimatexpertis till hälsoprojekt i Östafrika

Internationellt projekt studerar hur miljöförändringar kan inverka på hälsan i Östafrika. Arbetet koncentreras på spridning och effekter av sjukdomar som malaria och denguefeber.

Climate expertise to health project in East Africa

Enheten för miljö- och hälsorisker kommer att bättre kunna förutsäga och hantera hälsoriskerna. Projektet fokuserar på östra Afrika. Under fyra år kommer ett femtontal partner från olika delar av Afrika och Afrika att samarbeta. Förutom klimat- och miljöexperter ingår specialister inom hälsoområdet samt berörda myndigheter och civilsamhället.



Healthy Futures kommer att arbeta med spridning och effekter av sjukdomar som malaria och denguefeber. Sjukdomarna sprids via myggor, och enbart i Afrika över en miljon barn i

Contributions to climate information/assessment reports



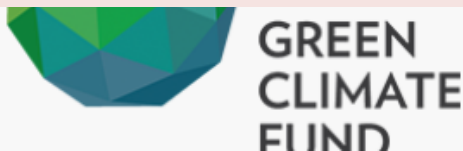
Sessions/presentations at major conferences/UNFCCC...

Input to organizing and scheduling future work of the IPCC



Analysis Campaign -train scientists, engage users. for the IPCC SR15. Further

Cooperation with Green Climate Fund, growing demand for information from SMHI/CORDEX!!

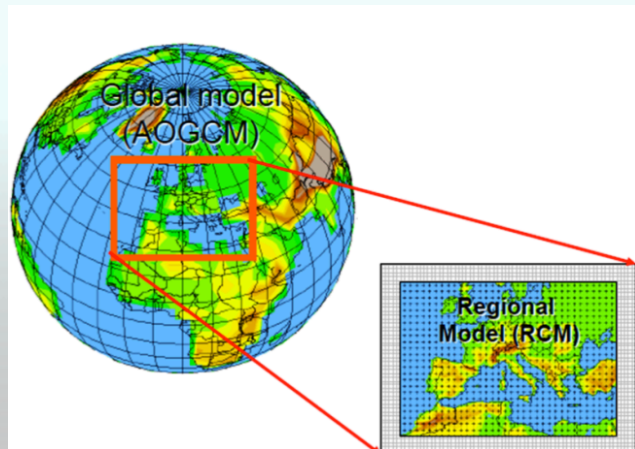
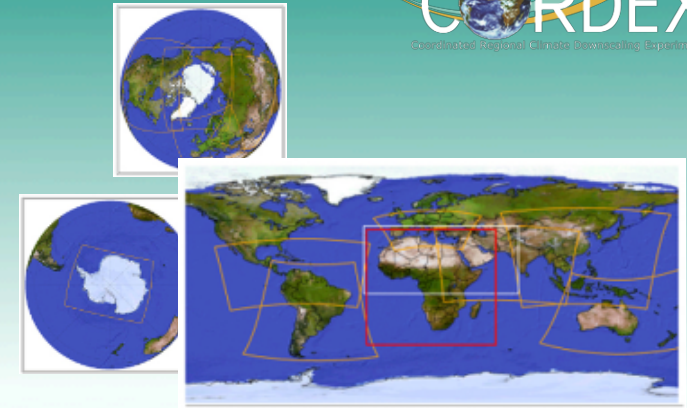
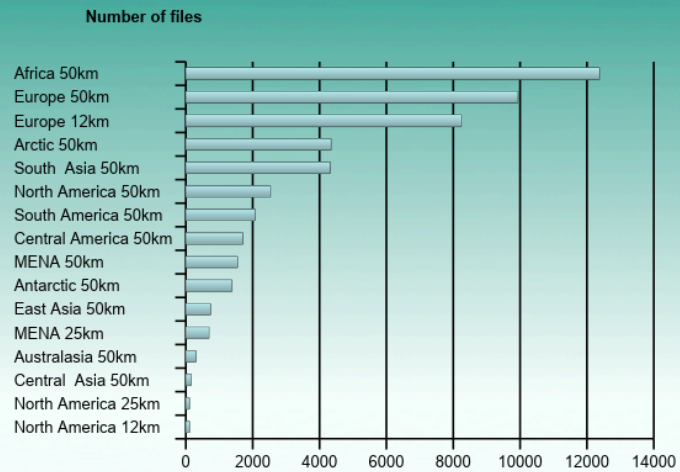


led by users spread over a large number of years. <https://www.rclimateanalysis/insights/?section=...>

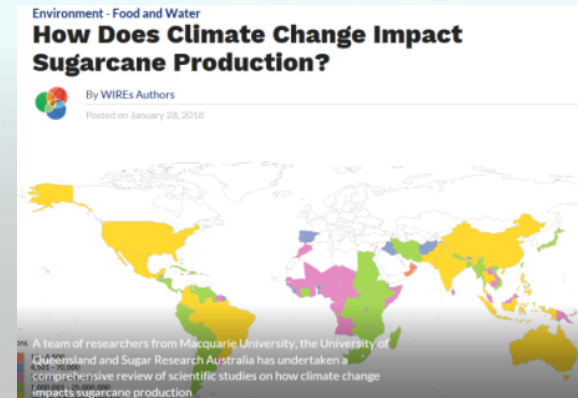
to the MedECC report, "A Regional Climate Change Assessment for the Mediterranean Region"

Interdisciplinary research/cooperation





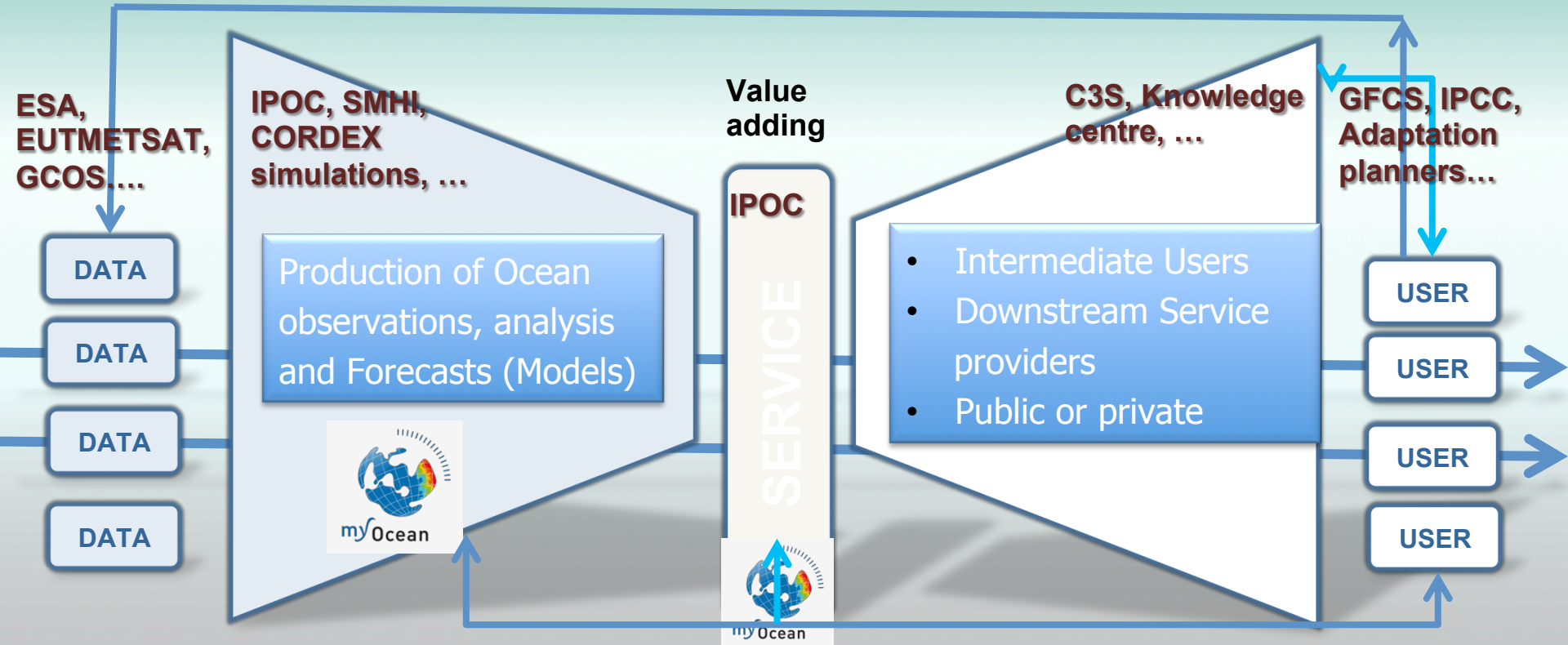
Courtesy; Justin Glisan



CORDEX?



marine service



- User/stakeholder workshops
- Newsletters, Exhibitions
- Tutorials, Trainings
- User pilots > user cases
- Success stories
- Data accessible and easily usable, servicedesk

Resources – computers and personnel!



Finance Opportunities; APN, EU, World Bank, Development Banks, SEI, SIDA, GCF, possibly Future Earth....

Other recent/ongoing activities



CORDEX South East Asia (SEA), <http://www.ukm.my/seaclid-cordex/#>

- FPSs, to implement the regional challenges; local/regional focus, transferrable to other regions, implementation,
Very positive net-working effect from the FPS-studies, attracting
'new' experts to the community
- Several hundred peer reviewed articles, MENA/INDIA/...
assessment reports
- RICCAR Arab Climate Change Assessment Report, <https://www.unescwa.org/publications/riccar-arab-climate-change-assessment-report>
- Hindu Kush Himalayan Monitoring and Assessment Programme
(HIMAP; www.icimod.org/himap) partly based on CORDEX results
- Future Climate Change Projections over India assessed using CORDEX South Asia RCM outputs
(<http://cccr.tropmet.res.in/home/reports.jsp>)
- WCRP Report No17_2017
- EURO-CORDEX guidelines on climate projections and its use completed, <http://euro-cordex.net/imperia/md/content/csc/cordex/euro-cordex-guidelines-version1.0-2017.08.pdf>
- The Arctic ESD tool is followed by users spread over a large number of countries
<https://www.facebook.com/Rclimateanalysis/insights/?section=navPeople>
- Med-CORDEX contributing to the MedECC report, "A Regional Climate Change Assessment Report" targeting