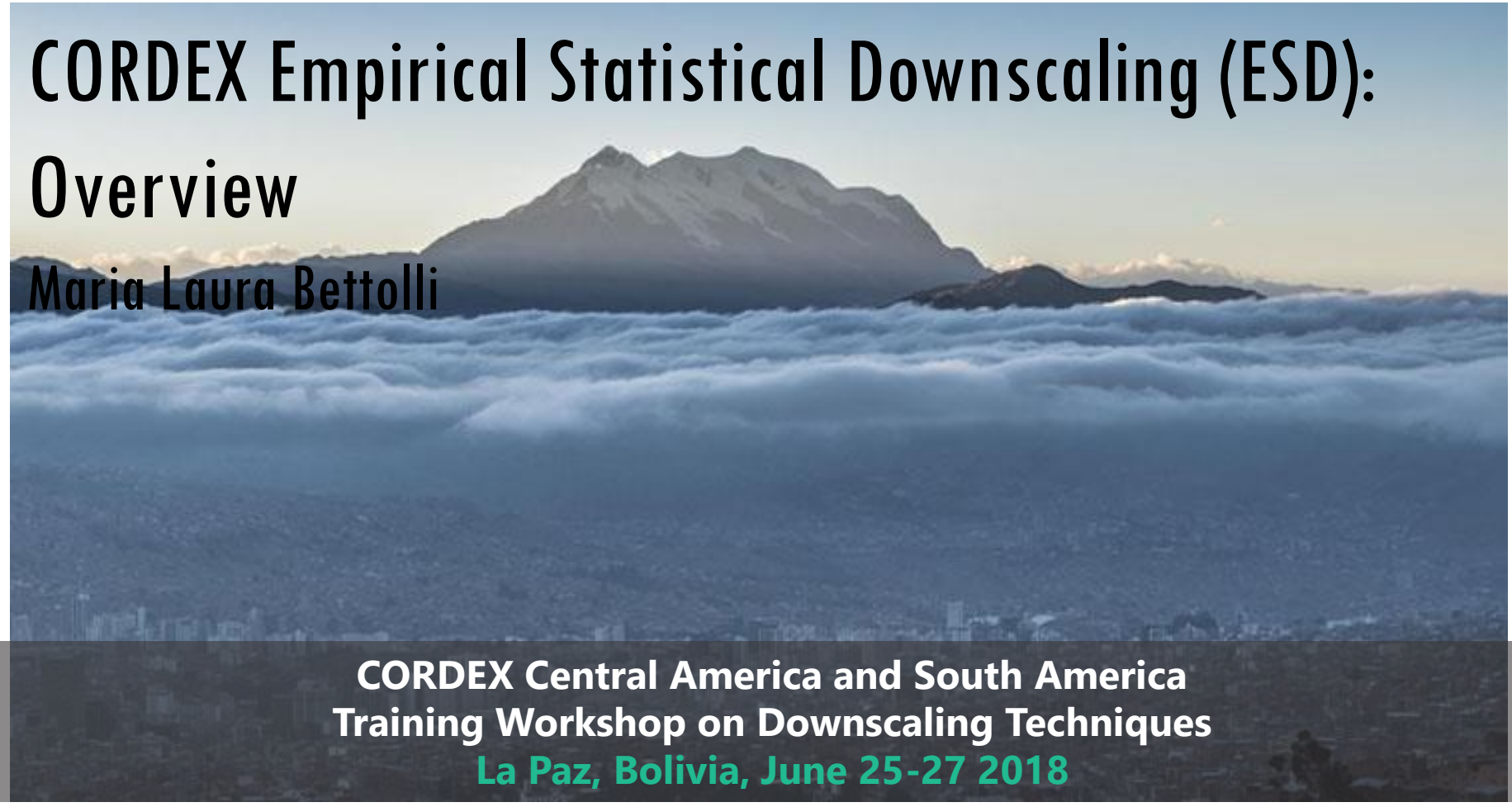
CORDEX Empirical Statistical Downscaling (ESD): Overview

Maria Laura Bettolli



CORDEX Central America and South America
Training Workshop on Downscaling Techniques
La Paz, Bolivia, June 25-27 2018

CORDEX AND CORDEX-ESD

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However, for different reasons, the ESD community lacks global coordination.

It is important for the ESD community to organize itself and progress toward a framework compatible with CORDEX-RCM development.

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Cape Town, Jun 2015

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These workshops helped to stimulate and coordinate initial discussions regarding CORDEX-ESD organization and activities.

CORDEX-ESD

As a first coordinated activity, a prototype experiment was designed:
- for La Plata Basin
- to encourage collaboration and coordinate a inter-comparison of methods.

Protocols for CORDEX ESD Experiment 1

This protocol document defines the initial experimental framework for the ESD counterpart to the RCM activities within the CORDEX programme.

Please register for CORDEX ESD Experiment 1 at the following URL:

http://www.csag.uct.ac.za/cordex-esd/

General Concept

The CORDEX-ESD Experiment 1 is a method evaluation experiment; that is, it focuses on the historical period[1] and does not use data from GCM climate change simulations[2]. The experiment seeks to engage as broadly as possible with the ESD community and provide opportunities to address dual objectives: characterizing optimal ESD skill under the constraints of intended transferability to using GCM predictors, and exploring the ESD limits in resolving the signal of the large-scale conditioning of local scale climate.

More specifically, the primary objectives are:

(1) to delineate the relative skill attributes of different statistical downscaling approaches when applied to a common source of predictors and predictands, and
(2) to assess the added-value[3] that ESD can provide from coarse scale predictor fields taken from GCMs.

With that in mind, the protocol permits a relatively straightforward application of an ESD method with the intent to include participation from as many of the ESD community as practical. The protocol gives flexibility in the choice of predictor variables within the limits

http://cordex.org/wp-content/uploads/2017/06/CORDEX_ESD_Experiment1.pdf

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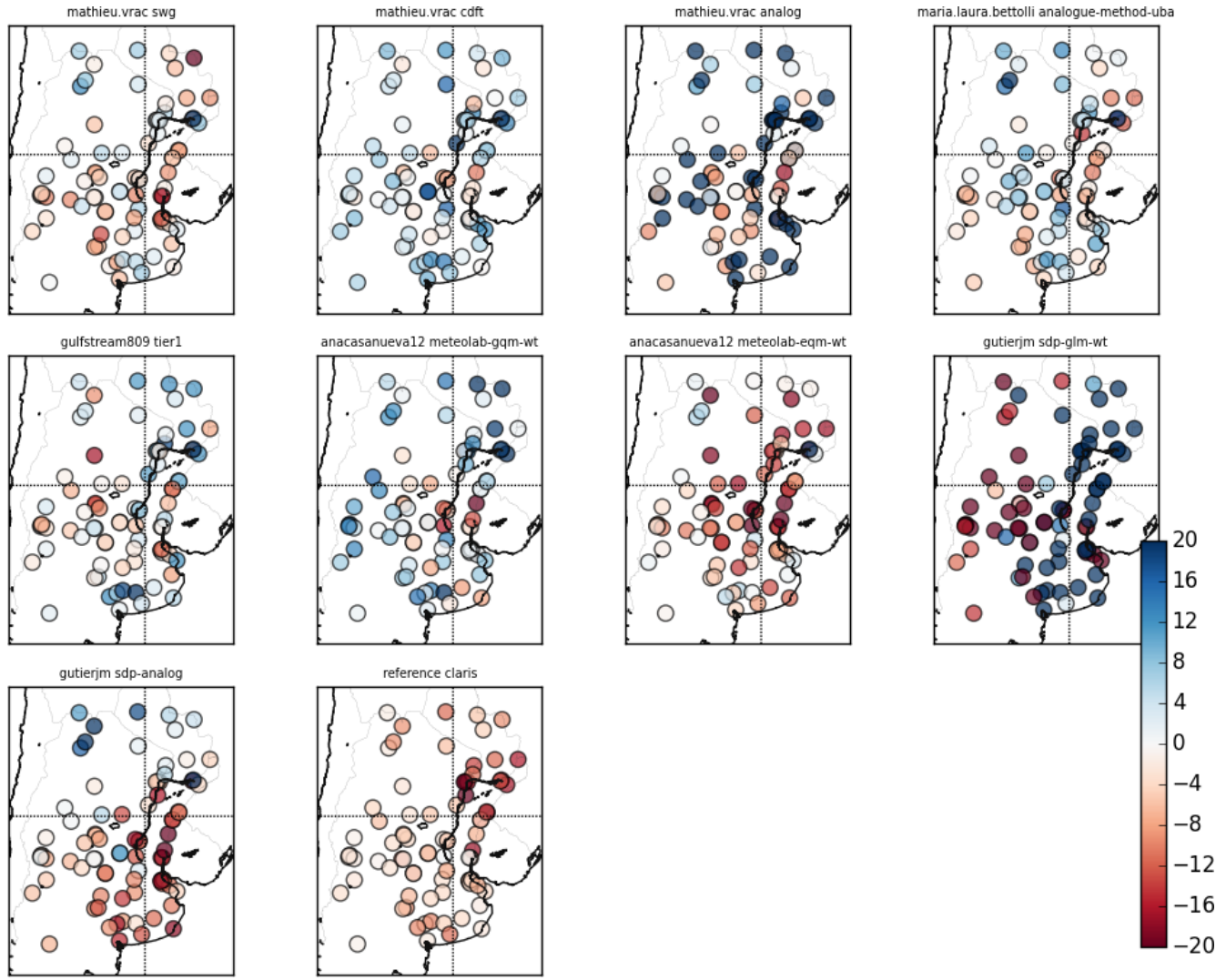

Tier 1 monthly mean rainfall

CORDEX-ESD

As a result of these activities and discussions a CORDEX-ESD Reference Document establishing its mission, objectives, organization and mid-term plans was developed.

Reference Document on CORDEX-ESD Mid-term Plans

Authors
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Background
There is a growing demand for plausible, defensible and actionable region-specific information on potential future climate change. Such information might be obtained from various sources, including raw projections from global coupled atmosphere ocean general circulation models (in the following GCMs), dynamical downscaling of GCM projections (in the following RCMs) , and statistical downscaling (often called empirical statistical downscaling, ESD) including classical perfect prognosis approaches and the so-called bias correction of GCM and RCM projections. All downscaling approaches suffer from a range of shortcomings and limitations. For statistical downscaling a variety of methods and sub-methods exist, each designed for different purposes and user problems, often without clearly formulating and testing the underlying assumptions.

http://cordex.org/wp-content/uploads/2017/08/CORDEX_ESD_Reference_Document.pdf

CORDEX-ESD: Mission and Objectives

The mission of CORDEX-ESD is to guide and coordinate the development, validation and use of statistical downscaling methods, and also to contribute to the generation and interpretation of region-specific climate change projections.

CORDEX-ESD: Mission and Objectives

The specific objectives of CORDEX-ESD are:

- to foster communication, collaboration and coordination within the ESD community,
- to improve collaboration with the RCM and GCM communities and with stakeholders;
- to produce an authoritative description of a technique family tree;
- to develop a framework for ESD studies;
- to develop a protocol for validation of regional climate projections and assessment of added value, with a focus on statistical downscaling and correction methods;
- to contribute to a framework for high-end regional climate change studies, including CORDEX Flagship Pilot Studies (FPS) and WGRC Frontiers of Climate Information (FOCI) projects;
- to contribute to the international archives of regional projections (e.g. Copernicus.eu);
- to provide cohesion across the ESD community towards major scientific questions

CORDEX-ESD: Organization

CORDEX-ESD is currently organized as an ad-hoc global community, coordinated by an executive committee.

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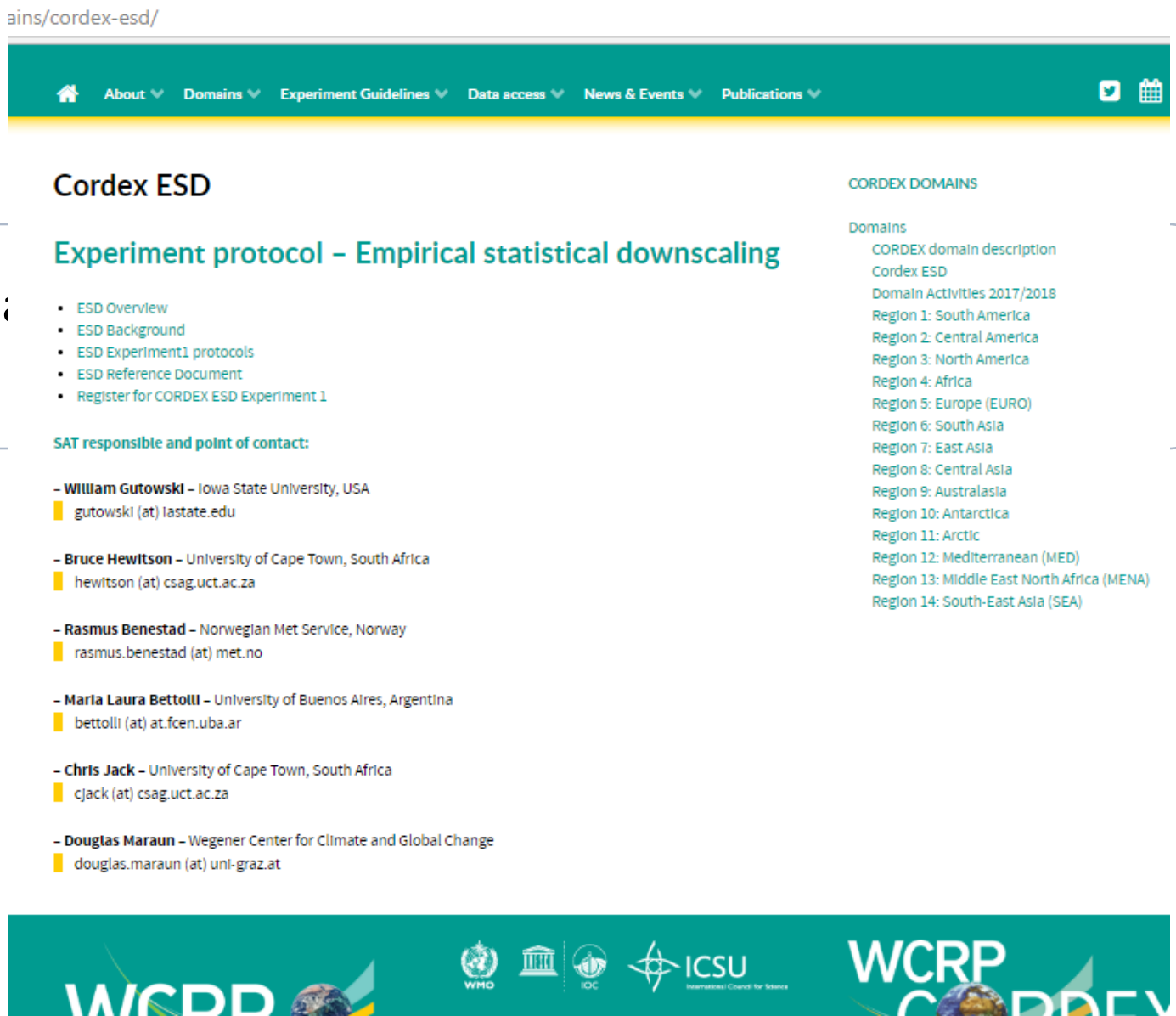

CORDEX-ESD: Ongoing activities

Design of the CORDEX-ESD CORE, which objective is to provide a downscaled climate data from a subset of CORDEX-ESD methods that are consistently implemented for all continental regions, and which provide a completed matrix of GCM-ESD pairings.

Supporting regional ESD coordinated activities: for instance the outcomes of this workshop!

CORDEX-ESD: Ongoing activities

THANK YOU!!