SPECS
Climate Prediction for Climate Services: Highlights

Antje Weisheimer
University of Oxford and ECMWF

SPECS
Seasonal-to-decadal climate Prediction for the improvement of European Climate Services

SPECS motivation

What: to produce quasi-operational and actionable local climate information

Why: need information with improved forecast quality, a focus on extreme climate events and enhanced communication and services for RCOFs, NHMSs and a wide range of public and private stakeholders

How: with a new generation of reliable European climate forecast systems, including initialised ESMs, efficient regionalisation tools and combination methods, and an enhanced dissemination and communication protocol

Where: over land, focus on Europe, Africa, South America

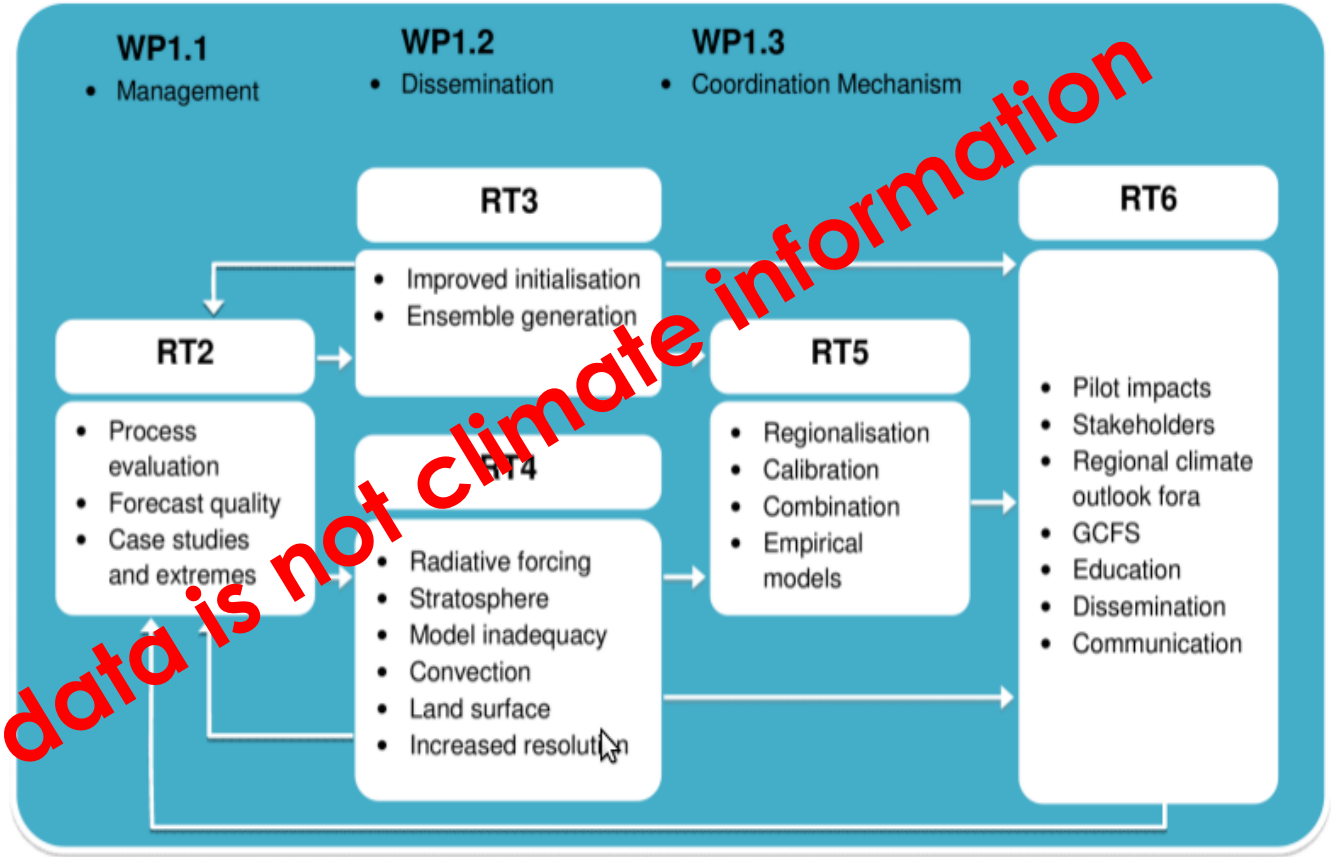
When: seasonal-to-decadal time scales over the longest possible observational period

http://www.specs-fp7.eu

SPECS Overview

Strong links to EUPORIAS, but also NACLIM, IS-ENES2, PREFACE, …

Forecast System	Project Partners
CNRM-CM5	CNRM, CERFACS
EC-Earth	KNMI, SMHI, BSC, ENEA
IFS/NEMO	ECMWF, UOXF
IPSL-CM5	CNRS
MPI-ESM	MPG, Uni[illegible]
UM	UKMET



Climate data is not climate information

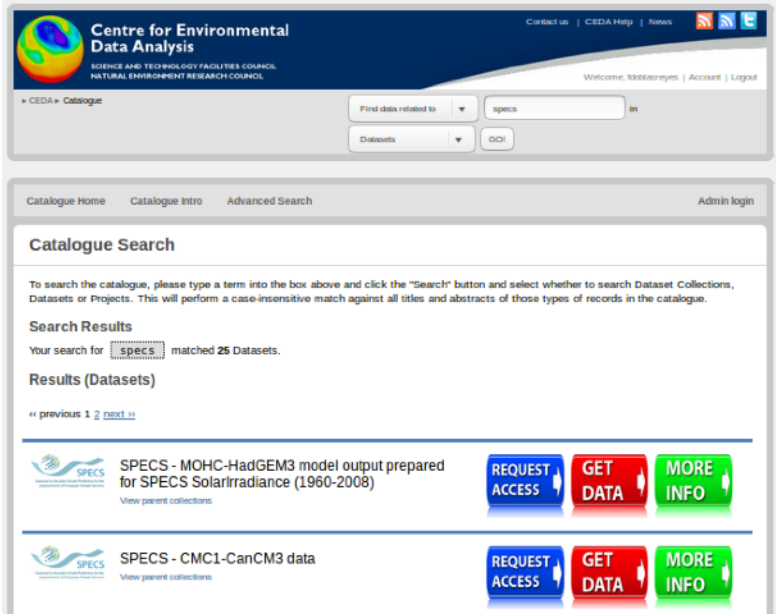
WP1.1: Management
WP1.2: Dissemination
WP1.3: Coordination across EUPORIAS, NACLIM & SPECS
RT2: Evaluation of current s2d forecast systems
RT3: Forecast strategies
RT4: Improved systems
RT5: Calibrated predictions at the local scale

Coordinated experiments

Tenths of climate prediction experiments, seven models, with different configurations and parameterisations

Focus on both skill improvements and processes (case studies)

130 TB of output (and growing), most of it available from ESGF (a primer in climate prediction), curated in the long term



Data management and experiment documentation are fundamental. They shouldn't be underestimated

Open access tools

Portals are useful, but open access tools allow to go beyond what is initially considered by portal developers

The packages created in SPECS can be better adapted to address specific problems in an interaction with the users

SpecsVerification: Forecast Verification Routines for the SPECS FP7 Project

A collection of new forecast verification routines for the SPECS FP7 project. The emphasis is on comparative verification of ensemble forecasts.

Version:	0.4-1
Published:	2015-10-23
Author:	Stefan Siegert [aut, cre]
Maintainer:	Stefan Siegert <s.siegert at exeter.ac.uk>
License:	GPL-2 | GPL-3 [expanded from: GPL (≥ 2)]
NeedsCompilation:	yes
CRAN checks:	SpecsVerification results

Downloads:

Reference manual:	SpecsVerification.pdf
Package source:	SpecsVerification_0.4-1.tar.gz
Windows binaries:	r-devel: SpecsVerification_0.4-1.zip, r-release:
OS X Mavericks binaries:	r-release: SpecsVerification_0.4-1.tgz, r-oldrel:
Old sources:	SpecsVerification archive

Reverse dependencies:

Reverse depends:	easyVerification
Reverse imports:	s2dverification

Linking:

Please use the canonical form https://CRAN.R-project.org/package=SpecsVerifica

s2dverification: Set of Common Tools for Forecast Verification

Set of tools to verify forecasts through the computation of typical prediction scores against one or more observational datasets or reanalyses (a reanalysis being a physical extrapolation of observations that relies on the equations from a model, not a pure observational dataset). Intended for seasonal to decadal climate forecasts although can be useful to verify other kinds of forecasts. The package can be helpful in climate sciences for other purposes than forecasting.

Version:	2.5.0
Depends:	R (≥ 2.14.1), methods, maps
Imports:	ncdf4, GEOmap, geomapdata, mapproj, abind, parallel, bigmemory, SpecsVerification, plyr
Suggests:	easyVerification
Published:	2016-02-17
Author:	Virginie Guemas [aut], Nicolau Manubens [aut, cre], Louis-Philippe Caron [aut], Verónica Torralba [aut], Chloé Prodhomme [aut], Martin Ménégoz [aut], Javier Garcia-Serrano [aut], Fabian Lienert [aut], Ludovic Auger [aut], Isabel Andreu-Burillo [aut]
Maintainer:	Nicolau Manubens <nicolau.manubens at bsc.es>
BugReports:	https://earth.bsc.es/gitlab/es/s2dverification/issues
License:	GPL-3
URL:	https://earth.bsc.es/gitlab/es/s2dverification/wikis/home
NeedsCompilation:	no
SystemRequirements:	cdo
CRAN checks:	s2dverification results

SantanderMetGroup / downscaleR

Watch 9 Star 12 Fork 19

Code Issues 8 Pull requests 1 Projects 0 Wiki Pulse Graphs

R package for statistical downscaling

4 branches 25 releases 7 contributors

Find file Clone or download

Latest commit c900824 2 days ago

in biasCorrection when applying the "delta" method and cross ... 2 days ago

plotClimatology for lattice plots 4 months ago

changes in subsetGrid and man-roxygen/templateObsPredSim 6 months ago

date 12 days ago

ignore update 2 years ago

DESCRIPTION 12 days ago

date 12 days ago

date 16 days ago

in README file 12 days ago

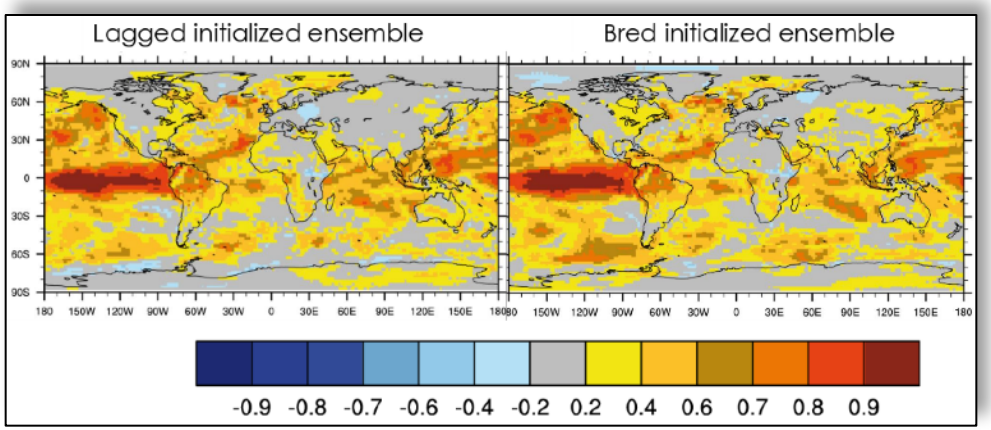
There is no magic recipe, users should be accompanied to make an efficient use of these tools

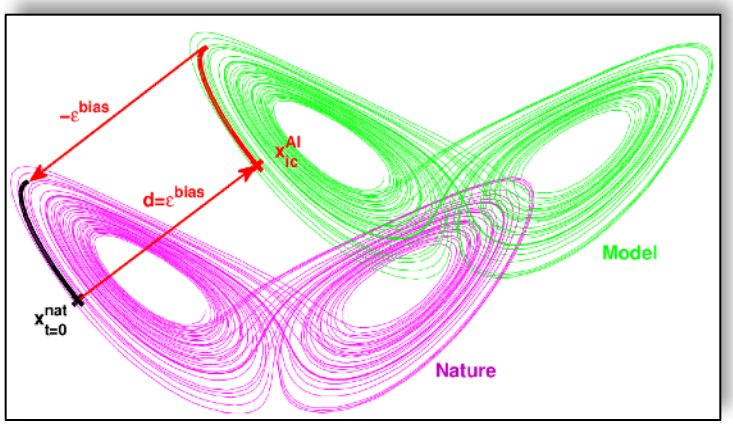
Forecast initialisation

Initialisation matters, but the initialisation problem is far from being resolved; the initial condition uncertainty remains large (ocean, land surface and sea ice); better use of data assimilation techniques is needed

The forecast drift is a huge problem that has been characterised; some links between drift and skill have been identified

Simplified models can be very useful to explore solutions like coupled initialisation



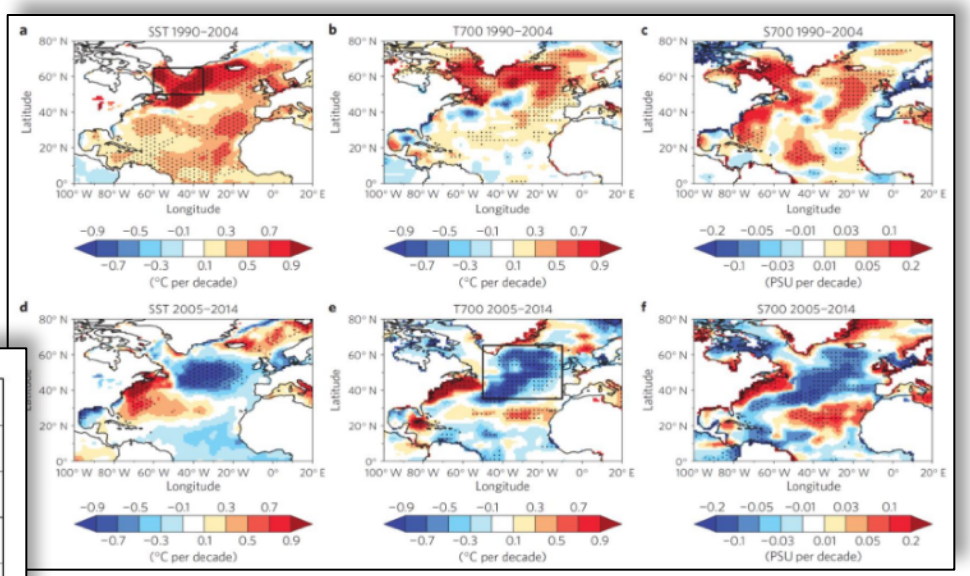


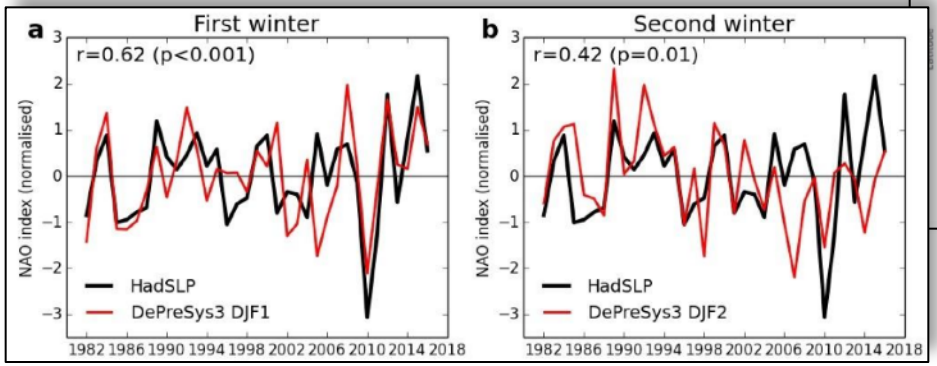
Models predict in a non-stationary state (because of the drift) and the systematic error is too large at times to benefit from good initial conditions

Process understanding

Case studies based on observed extreme events (European summer 2003 and 2010, North Atlantic warming and cooling) have been analysed

Interesting sources of predictability for some events have been identified



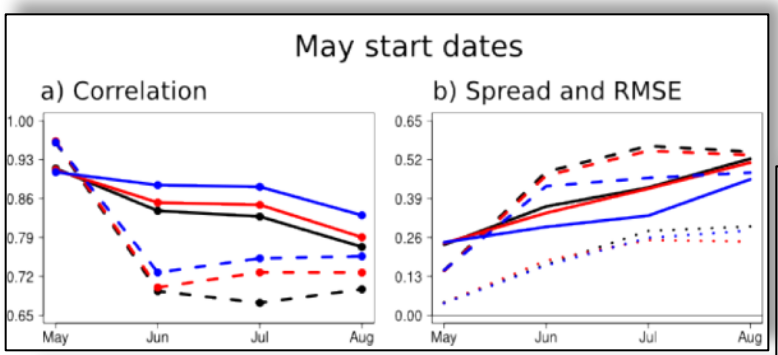


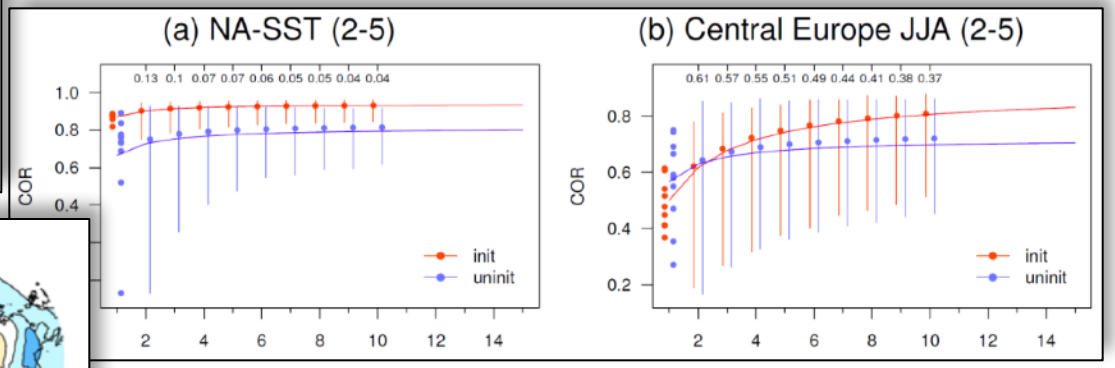
The process-based analysis of hits, misses and false alarms help improving the forecast systems if it is done in a coordinated multi-model context

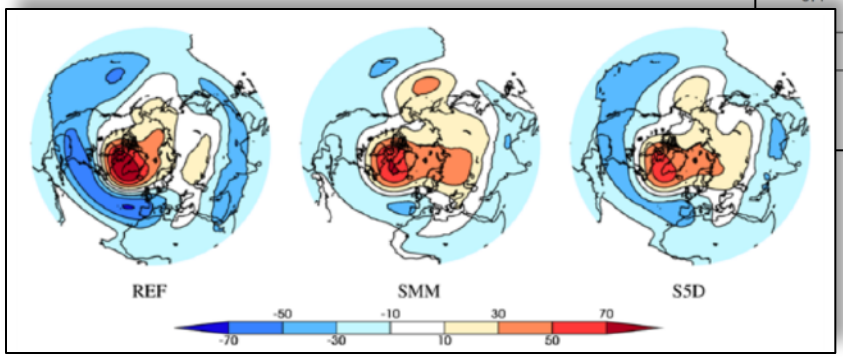
Better forecast systems

Improvements in the resolution, vegetation treatment, stochastic parameterisations, initialisation, sampling (ensemble and hindcast size), …

Improvements in forecast quality are found, but statistical significance is an issue



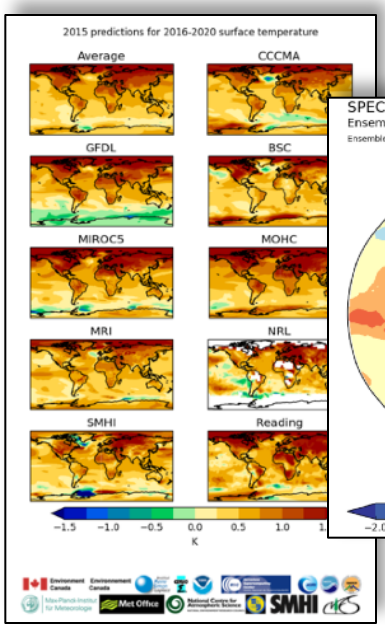


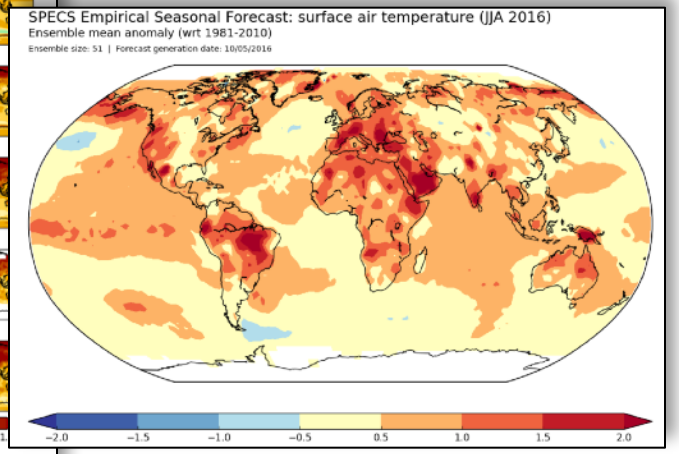


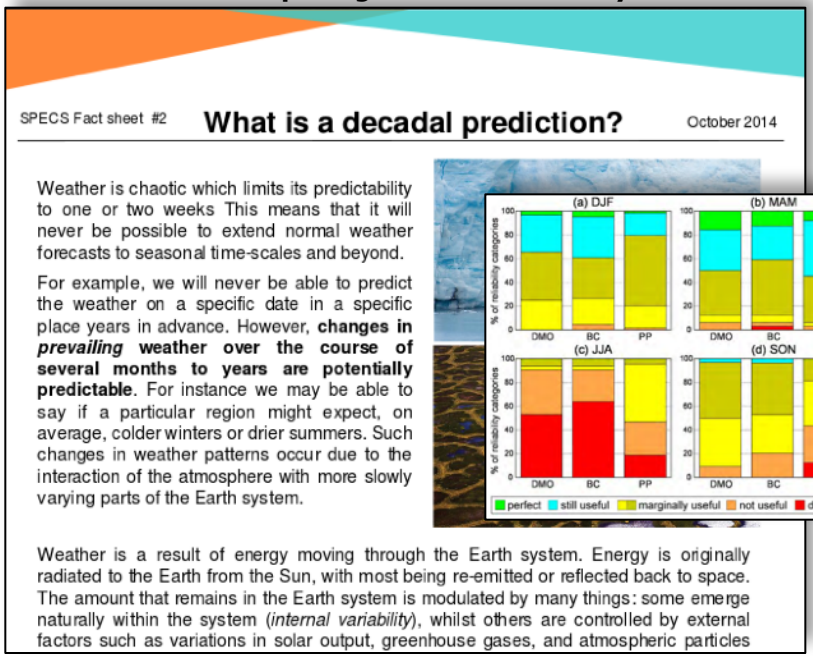
Improving the forecast systems takes long time; need to focus on those aspects that have a stronger impact for a wide range of users (e-g- NAO)

Much more than global models

The operationalisation of decadal forecasts, the creation of robust empirical benchmarks, the exhaustive illustration of the (limited) benefits of downscaling and model combination, the generation of entry-level documentation, have been rewarding aspects of the project activity






SPECS Fact sheet #2 **What is a decadal prediction?** October 2014

Weather is chaotic which limits its predictability to one or two weeks This means that it will never be possible to extend normal weather forecasts to seasonal time-scales and beyond.

For example, we will never be able to predict the weather on a specific date in a specific place years in advance. However, **changes in *prevailing* weather over the course of several months to years are potentially predictable**. For instance we may be able to say if a particular region might expect, on average, colder winters or drier summers. Such changes in weather patterns occur due to the interaction of the atmosphere with more slowly varying parts of the Earth system.

Weather is a result of energy moving through the Earth system. Energy is originally radiated to the Earth from the Sun, with most being re-emitted or reflected back to space. The amount that remains in the Earth system is modulated by many things: some emerge naturally within the system (*internal variability*), whilst others are controlled by external factors such as variations in solar output, greenhouse gases, and atmospheric particles

Multidisciplinarity is fundamental in climate services, and this should include climate modellers and forecasters, which requires profiles that are not readily available

Legacy

SPECS has tried to make a difference in engaging with multiple communities like WCRP (WGSIP drift project), Polar Prediction Project (role of sea ice and snow in climate prediction), GFCS (tools and examples for the RCOFs), Copernicus (verification and standards), …

Copernicus
Europe's eyes on Earth

YOPP
YEAR OF POLAR PREDICTION

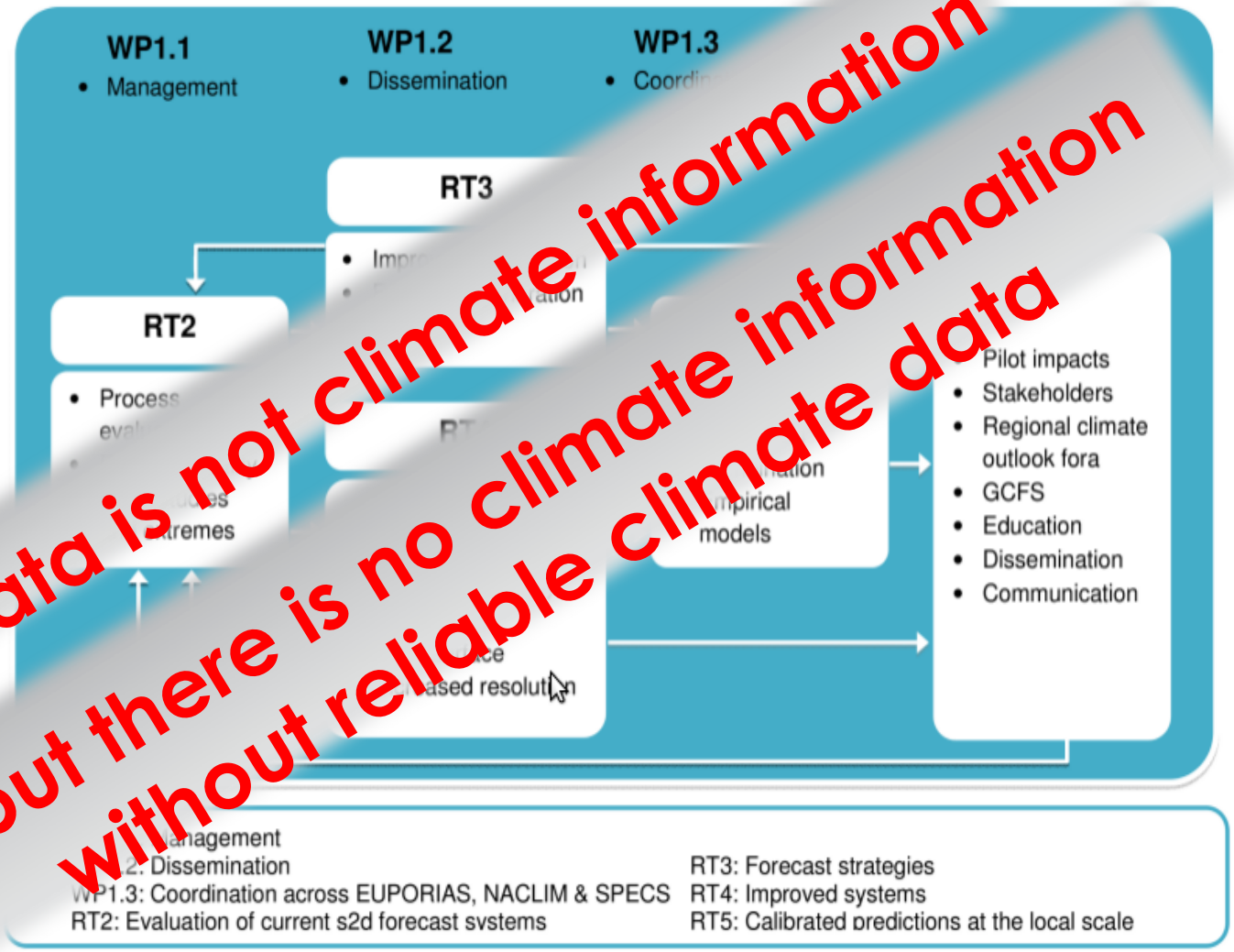
GFCS GLOBAL FRAMEWORK FOR CLIMATE SERVICES

The sustainability of the outcome of research projects in an international context can be ensured by the operationalisation of their conclusions

SPECS Overview

Strong links to EUPORIAS, but also NACLIM, IS-ENES2, PREF…

Forecast System	Project Partners
CNRM-CM5	CNRM, CERFACS
EC-Earth	KNMI, SMHI, BSC, ENEA
IFS/NEMO	ECMWF, UOXF
IPSL-CM5	CNR…
MPI-E…	…G, UniHH
UM	U…



Climate data is not climate information

… but there is no climate information without reliable climate data

SPECS
Climate Prediction for Climate Services

SPECS
Seasonal-to-decadal climate Prediction for the improvement of European Climate Services