Scenarios and related data for MACSUR2

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Scenario selection for MACSUR2

- Framing scenario selection (RCP/SSP)
- Ongoing scenario development in FP7 IMPRESSIONS
- Some examples of sources of data and scenarios
RCPs, SSPs and RAPs

Representative Ag Pathways
• economic & social development narratives
• agricultural technology trends
• prices and costs of production
• ag, mitigation & other policy

Antle & Nelson, pers. comm., 2012
Scenario selection for IMPRESSIONS

<table>
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<tr>
<th></th>
<th>SSP1</th>
<th>SSP3</th>
<th>SSP4</th>
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<tbody>
<tr>
<td>RCP8.5</td>
<td>0</td>
<td>XX</td>
<td>o</td>
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<tr>
<td>RCP4.5</td>
<td>XX</td>
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**IMPRESSIONS** – Impacts and Risks from High-End Scenarios: Strategies for Innovative Solutions (www.impressions-project.eu)
- Uses the RCP/SSP global scenario framework
- Pairs high-end climate (RCP8.5) with compatible socio-economic worlds (SSP5 and SSP3)
- Pairs low-end climate (RCP4.5) with compatible socio-economic worlds (SSP1, SSP3, SSP4) for which mitigation policy might also be required (SPAs)
- Facilitates comparison across SSPs for the same forcing (SSP4 vs SSP5 and SSP1 vs. SSP3 vs. SSP4)
- Facilitates comparison across forcings for the same SSP – SSP3 (RCP8.5 vs RCP4.5)
ICONICS

https://www2.cgd.ucar.edu/research/iconics

ICONICS COMMITTEE MEMBERSHIP

INTERNATIONAL COMMITTEE ON NEW INTEGRATED CLIMATE CHANGE ASSESSMENT SCENARIOS

ICONICS aims to organize the process of developing new socioeconomic scenarios to facilitate interdisciplinary research and assessment on climate change mitigation and adaptation. Proposed at the workshop on The Nature and Use of New Socioeconomic Pathways for Climate Change Research in 2011, the committee’s goals are to:

- Complete Shared Socioeconomic Pathways (SSPs) including narratives and quantification from models and other sources; and
- Facilitate establishment of a research program and limited coordinating infrastructure for long term IAM development and application of integrated scenarios beyond the IPCC AR5.

Read more background information on the process of developing new socioeconomic scenarios.

WORKING GROUPS

The work of the committee is organized into six working groups.
ICONICS

https://www2.cgd.ucar.edu/research/iconics

ICONICS WORKING GROUPS

WORKING GROUPS

ICONICS work is initially focused on several high priority tasks. Informal working groups are coordinating inputs from interested individuals and developing drafts for circulation and comment. The list of working groups below includes links to individual working group pages for additional information. If you are interested in working on one of these topics, please contact the working group chair listed.

- Narratives for SSPs
  Co-chairs: Brian O'Neill, Elmar Kriegler

- IAV-IAM handshake document and research community interactions
  Chair: Jae Edmonds

- IAM quantitative drivers and IAM scenarios for SSPs
  Co-chairs: Detlef van Vuuren, Keywan Riahi

- IAV quantitative elements and evaluation metrics
  Co-chairs: Marc Levy, Bas van Ruijven

- Nested scenarios across geographies and time
  Co-chairs: Kasper Kok, Ben Preston

- Roadmap for future IAV-IAM collaboration on scenarios
  Chair: Stephane Hallegatte
SSP Database at IIASA

https://secure.iiasa.ac.at/web-apps/ene/SspDb/dsd?Action=htmlpage&page=welcome

SSP Database (version 0.93):

Note that the community review of the SSP data has been completed in October 2012. The SSP data on this website has been updated since then and reflects changes from March 2013 in response to the reviewer comments. Please send any comments or questions to ssp-comments@iiasa.ac.at.

Introduction

The SSP database aims at the documentation of quantitative projections of the so-called Shared Socioeconomic Pathways (SSPs) and related Integrated Assessment scenarios. The SSPs are part of a new framework that the climate change research community has adopted to facilitate the integrated analysis of future climate impacts, vulnerabilities, adaptation, and mitigation. Information about the scenario process and the SSP framework can be found in Moss et al. (2010), Arnell et al. (2011), van Vuuren et al. (2012) and Kriegler et al. (2012). The framework is built around a matrix that combines climate forcing on one axis (as represented by the Representative Forcing Pathways) and socio-economic conditions on the other. Together, these two axes describe situations in which mitigation, adaptation and residual climate damage can be evaluated.

The SSP quantifications build upon the collaborative effort between the IAM and IAM community, which has met in a series of meetings and identified a limited set of five SSP storylines/narratives (O’Neill et al., 2012). The narratives describe the main characteristics of the SSP future development pathways. They served as the starting point for the identification of internally consistent assumptions for the quantification of SSP elements. Different modeling tools can be used to develop quantifications of these storylines, including factors like population, economic development, land use and energy use.

Currently (May 2012), the database includes projections for population and economic development, which are the elements that are most used as basis of both integrated assessment and IAM studies. Specifically, for the following elements quantifications are available:

1. population by age, sex, and education;
2. urbanization; and

SSP Database at IIASA

https://secure.iiasa.ac.at/web-apps/ene/SspDb/dsd?Action=htmlpage&page/welcome
Climate scenario selection for **IMPRESSIONS**

- **Core** set and **Extended** set
- **Climate system forcing**: RCP8.5 and RCP4.5 (radiative forcing by 2100 of 8.5 Wm\(^{-2}\) and 4.5 Wm\(^{-2}\) relative to pre-industrial)
Global annual mean surface air temperature anomalies (wrt 1986–2005) from CMIP5 concentration-driven experiments. Projections are shown for each RCP for the multi-model mean (solid lines) and the 5 to 95% range (±1.64 standard deviation) across the distribution of individual models (shading).

Source: Collins et al. (2015)
CMIP5 ensemble global mean temperature change for RCP8.5 and RCP4.5 relative to recent (1981-2010) and pre-industrial (1881-1910). 

High-end

Low-end
Climate scenario selection for IMPRESSIONS

- **Core** set and **Extended** set

- **Climate system forcing**: RCP8.5 and RCP4.5 (radiative forcing by 2100 of 8.5 Wm\(^{-2}\) and 4.5 Wm\(^{-2}\) relative to pre-industrial

- **CMIP5 global models**: simulations to 2100 assuming a given forcing conducted for the CMIP5 exercise using different Earth system model (ESM) simulations

- **Probabilistic climate**: regional projections of temperature and precipitation change (joint distributions) under a given forcing (two methods based on CMIP5)

- **Dynamically downscaled**: based on dynamical downscaling of CMIP5 global model outputs over Europe in the Co-Ordinated Regional Downscaling EXperiment (CORDEX) using fine resolution regional climate models

- **Climate sensitivity**: select GCMs with a high or low climate sensitivity

- **Regional patterns**: Spatial and seasonal patterns of changes in precipitation (primary criterion) and temperature over Europe, used to guide the selection of a manageable number of projections showing a representative range of patterns.

**IMPRESSIONS** – Impacts and Risks from High-End Scenarios: Strategies for Innovative Solutions (www.impressions-project.eu)
CMIP5 annual mean temperature changes (2071-2100 vs. 1981-2010) for 38 GCMs under RCP8.5 (ranked by global mean temperature change)

Source: Danish Meteorological Institute, unpublished
EURO-CORDEX domain

Source: Danish Meteorological Institute, unpublished
CORDEX RCM annual and seasonal mean temperature changes (2071-2100 vs. 1981-2010) for RCP8.5 over Europe (four examples ranked by temperature)

Source: Danish Meteorological Institute, unpublished
CORDEX RCM annual and seasonal mean precipitation changes (2071-2100 vs. 1981-2010) for RCP8.5 over Europe (four examples ranked by temperature)

Source: Danish Meteorological Institute, unpublished
IPCC Data Distribution Centre

http://www.ipcc-data.org/
Welcome to the IS-ENES climate4impact portal, oriented towards climate change impact modellers, impact and adaptation consultants, as well as other experts using climate change data.

Here you will find access to data and quick looks of global climate models (GCM) scenarios, as well as regional climate model (RCM) and downscaled higher resolution climate data. The portal provides data transformation tooling for tailoring data to your needs and mapping & plotting capabilities.

Guidance on how to use climate scenarios, documentation on the climate system, frequently asked questions and examples in several impact and adaptation themes are presented and described, along with the steps required to go from GCM data to impact model input data.

Latest

- Workshop held on design of scientific portals (Nov 2014, KNMI (NL)) download the presentations
- The climate4impact portal is operational since 15 April 2014: read more.

Click on one of these images to go to a specific climate change impact and adaptation theme.
http://climate4impact.eu/impactportal/general/index.jsp

![IS-ENES](http://climate4impact.eu/impactportal/general/index.jsp)

**Exploring climate model data**

- **Home**
- **Data discovery**
- **Downscaling**
- **Documentation**
- **Help**
- **About us**
- **Sign in**

**Search**

- **Project**: CMIP5, CORDEX
- **Variable**: Temperature, Min temperature, Max temperature, Precipitation, Conv. precipitation, Snow, Windspeed, Max windspeed, Eastward wind, Northward wind, Shortwave radiation down, Shortwave radiation up, Longwave radiation down, Longwave radiation up, Diffuse radiation, Total cloud cover, Surface specific humidity, Surface relative humidity, Specific humidity, Relative humidity, Surface relative humidity, Max relative humidity, Minimum relative humidity
- **Frequency**: 3 hourly, daily, monthly
- **Time frame**
- **Experiment**: Historical, RCP26, RCP45, RCP60, RCP85, Evaluation, 1pctCO2
- **Domain**: Search domain (CORDEX)
- **Models**: Found 182 model(s)

**Search datasets**

- Start search
Some other issues:

- Bias correction of downscaled climate data, and/or
- Change factor ("delta change") method
- Observed datasets, e.g.:
  - Site data (availability?)
  - CRU E-OBS gridded data (daily: TG TN TX RR PP; 0.25º lat/lon)
  - Agri4Cast Data (daily: 25 km)
  - WATCH ERA-Interim data (3-hourly: T, Wind at 10m, PP, LWdown, SWdown, RR, Snowfall rate; 0.5º lat/lon resolution)
WATCH meteorological forcing data set

The WFDEI meteorological forcing data set: WATCH Forcing Data methodology applied to ERA-Interim reanalysis data

Graham P. Weedon¹, Gianpaolo Balsamo², Nicolas Bellouin³, Sandra Gomes⁴, Martin J. Best⁵, and Pedro Viterbo⁴

¹Met Office, Joint Centre for Hydrometeorological Research, Wallingford, UK, ²European Centre for Medium-Range Weather Forecasts, Reading, UK, ³Department of Meteorology, University of Reading, Reading, UK, ⁴Instituto Dom Luiz, University of Lisbon, Lisbon, Portugal, ⁵Met Office, Exeter, UK

Abstract The WFDEI meteorological forcing data set has been generated using the same methodology as the widely used WATCH Forcing Data (WFD) by making use of the ERA-Interim reanalysis data. We discuss the specifics of how changes in the reanalysis and processing have led to improvement over the WFD. We attribute improvements in precipitation and wind speed to the latest reanalysis basis data and improved downward shortwave fluxes to the changes in the aerosol corrections. Covering 1979–2012, the WFDEI will allow more thorough comparisons of hydrological and Earth System model outputs with hydrologically and phenologically relevant satellite products than using the WFD.

1. Introduction
First Implementation Plan
Approved December 2013

- Joint strategies
- Joint research funding
- Alignment of national research
- Collaboration with other research initiatives

Fast Track Activities
Preparing joint calls, elaborating strategies

2013 Joint calls (10M€)
- Russian Arctic and Boreal systems
- Societal transformations to face CC

2015 joint call (15M€)
- Climate predictability and inter-regional linkages
- Open to international with Belmont Forum (incl. India, China, Brazil...)

Planned 2016 joint call (75M€)
- Research for Climate Services
- ERA-NET Co-funded by MS & EC

Source: P. Monfray (JPI-Climate Co-Chair)