



Schweizerische Eidgenossenschaft  
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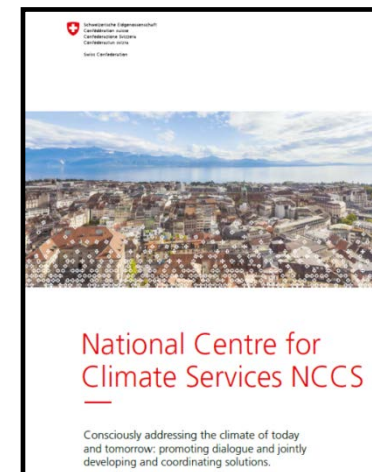
Swiss Confederation

Federal Department of Home Affairs FDHA  
Federal Office of Meteorology and Climatology MeteoSwiss



# Toward the new **CH2018** climate scenarios for Switzerland

**Andreas Fischer**, E. Zubler, E. Fischer,  
R. Knutti, S. Kotlarski, M. Liniger, C. Raible,  
C. Schär, S. Scherrer, C. Schwierz  
+ contributing scientists/technicians



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MeteoSwiss

**ETH** zürich



**u<sup>b</sup>**

**UNIVERSITÄT  
BERN**

# National Scenario Assessments

CH2018

CH2011



CH2007

MeteoSwiss

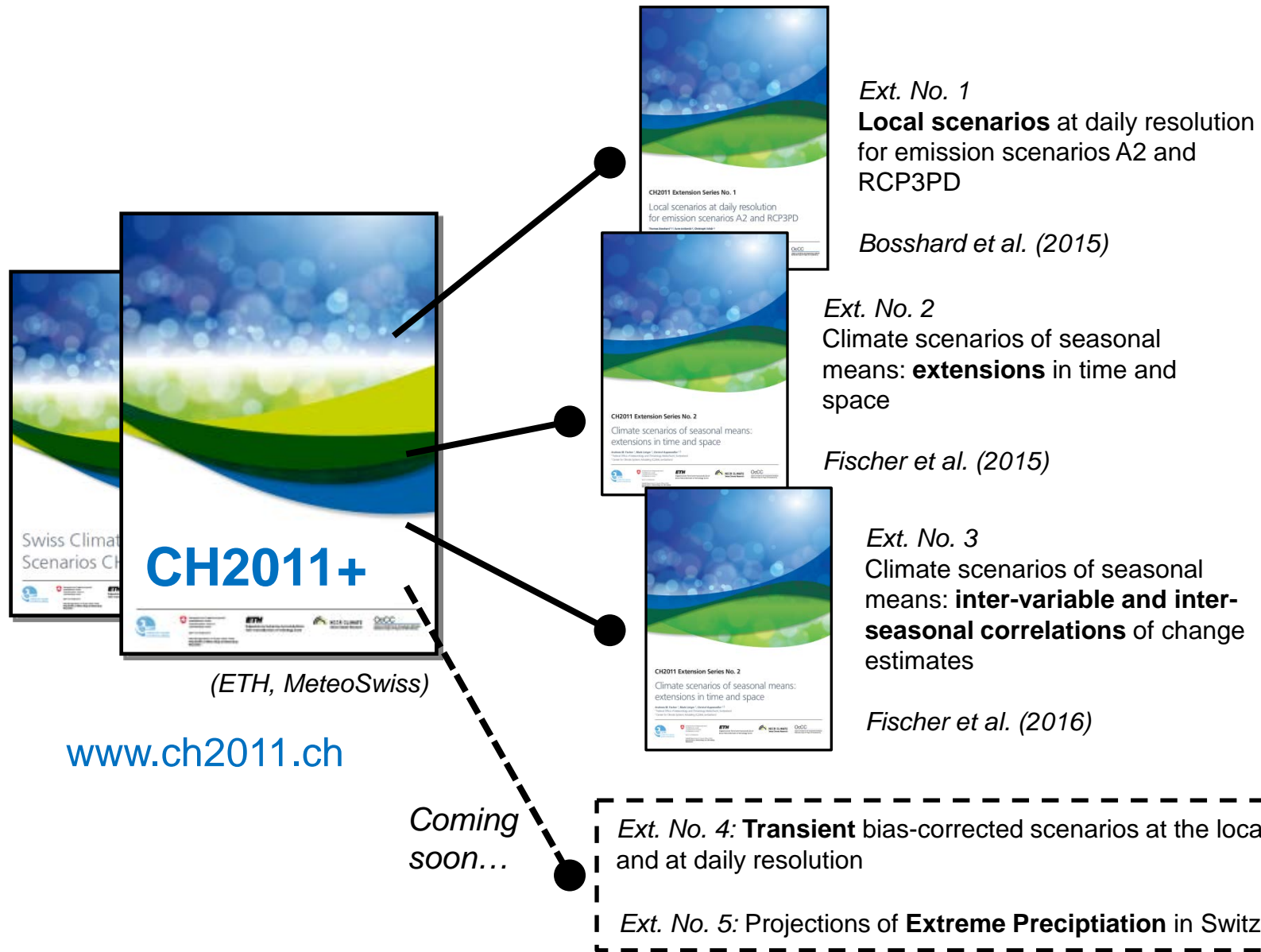


[www.ch2011.ch](http://www.ch2011.ch)





# Extensions of CH2011

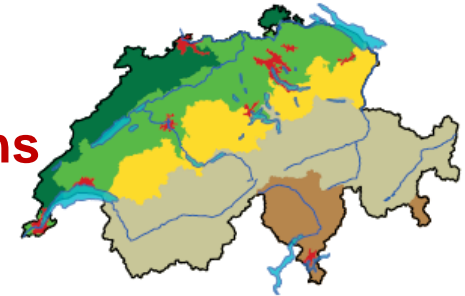


# Translation of CH2011

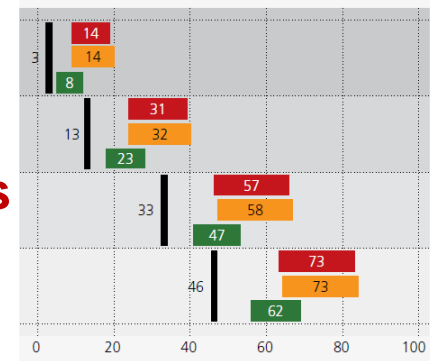
**Language**

→ in all Swiss languages

**Intuitive regions**



**Height-Dependence  
Sector-specific Indices**

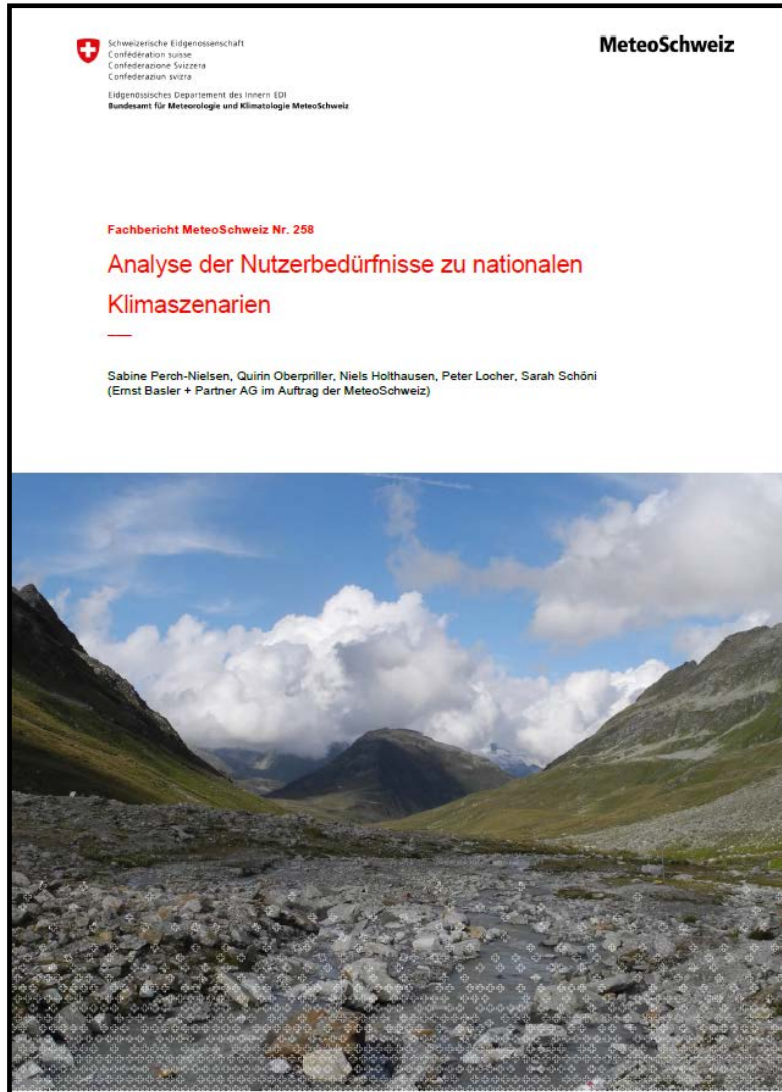


**Provision of  
absolute values**

Jahreszeit	Station	m ü.M.	Temperatur °C		
			1961-1990	1981-2010	um 2060
<b>Sommer</b>	Basel/Binningen	316	17.5	18.6	20.4 – 22.0
Juni	Delémont	439	16.7	17.7	19.4 – 21.1
Juli	Neuchâtel	485	17.6	18.6	20.3 – 22.0
August	Rünenberg	611	-	17.2	19.0 – 20.6



# Survey on End User Needs



## User Survey

Ernst **Basler** + **Partner**

June 2015 – January 2016  
Conducted by EBP

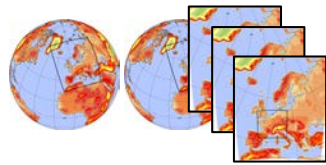
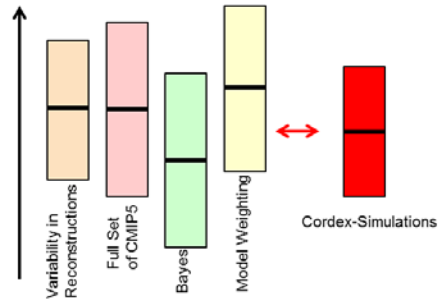
- Identification of target group
- sector-specific needs
- Way of usage
- Needs in dissemination



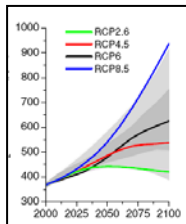
# Methodological Approach



## Uncertainty Assessment

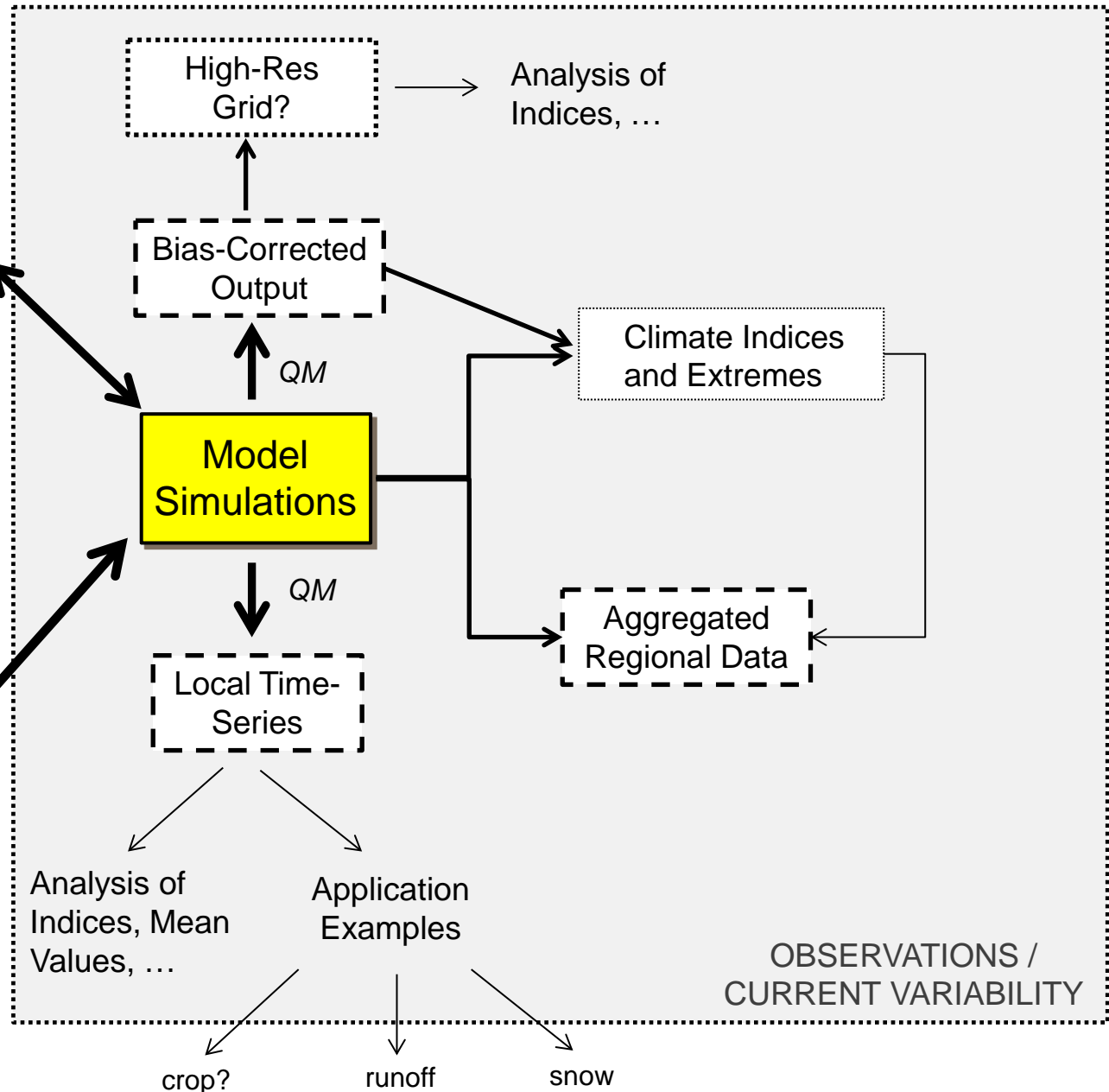


Model selection



Scenario selection

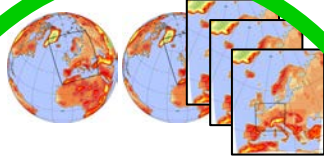
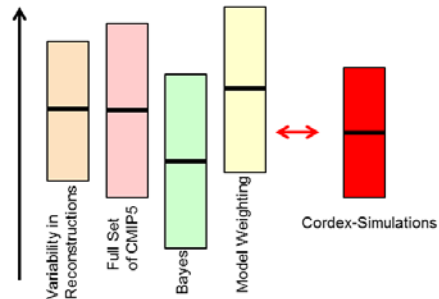
**Basis**



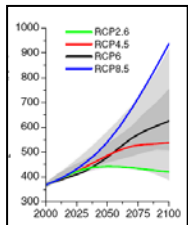
# Methodological Approach



## Uncertainty Assessment

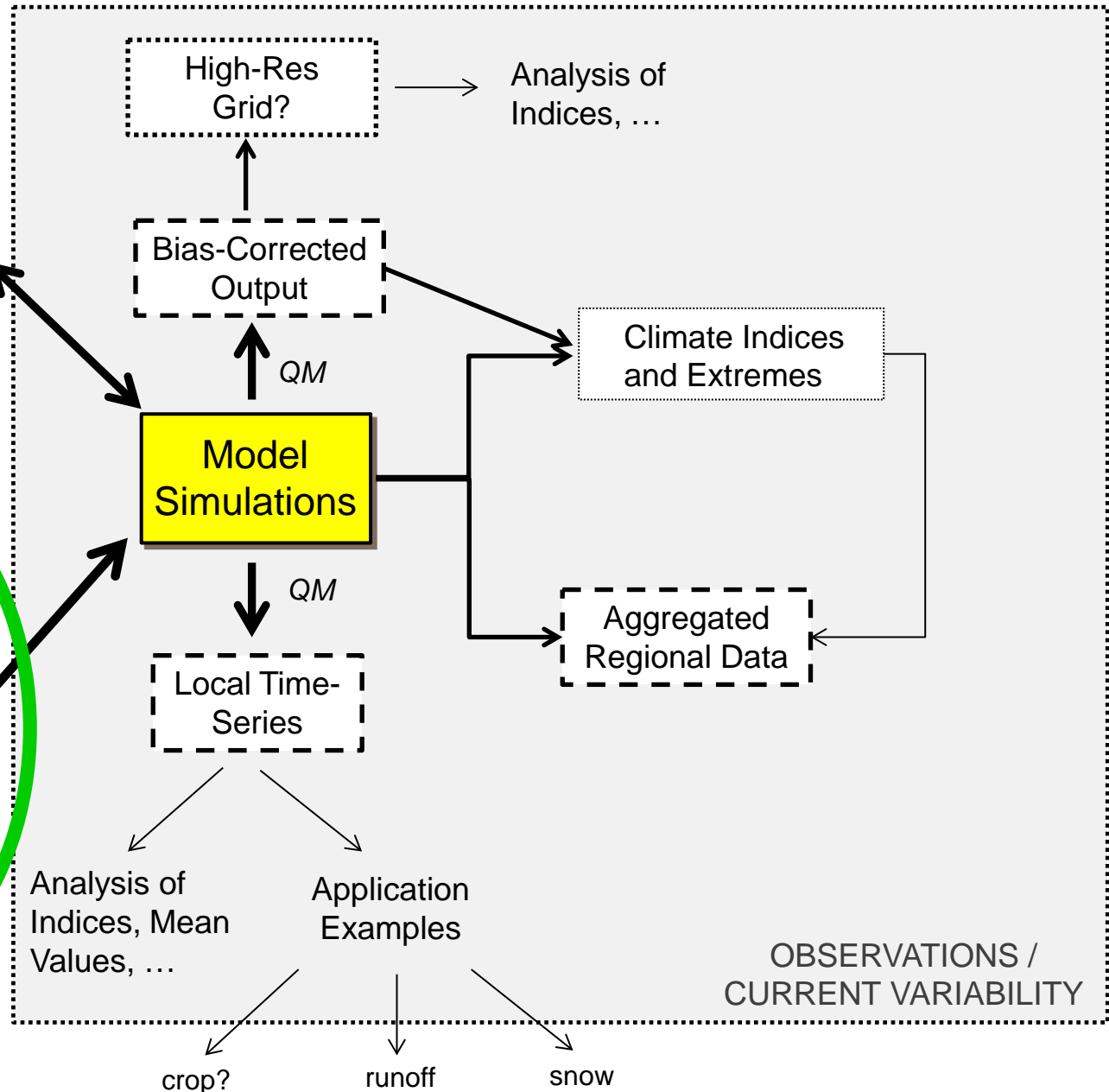


Model selection



Scenario selection

**Basis**





# Multi-Model Analyses

**Today, Poster Session, H21**

«The CORDEX RCM ensembles in the European Alps: Patterns of 21st Century Climate Change»  
*Kotlarski et al.*

Near-Surface Air Temperature Bias (°C)



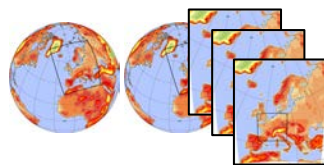
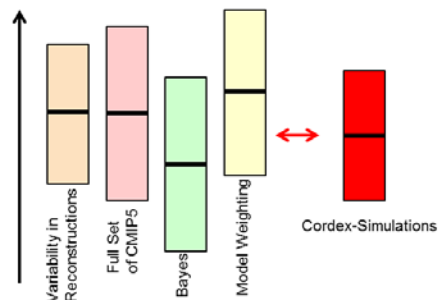
peculiar behaviour?



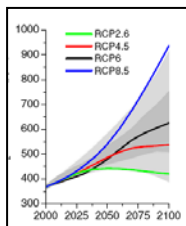
# Methodological Approach



## Uncertainty Assessment

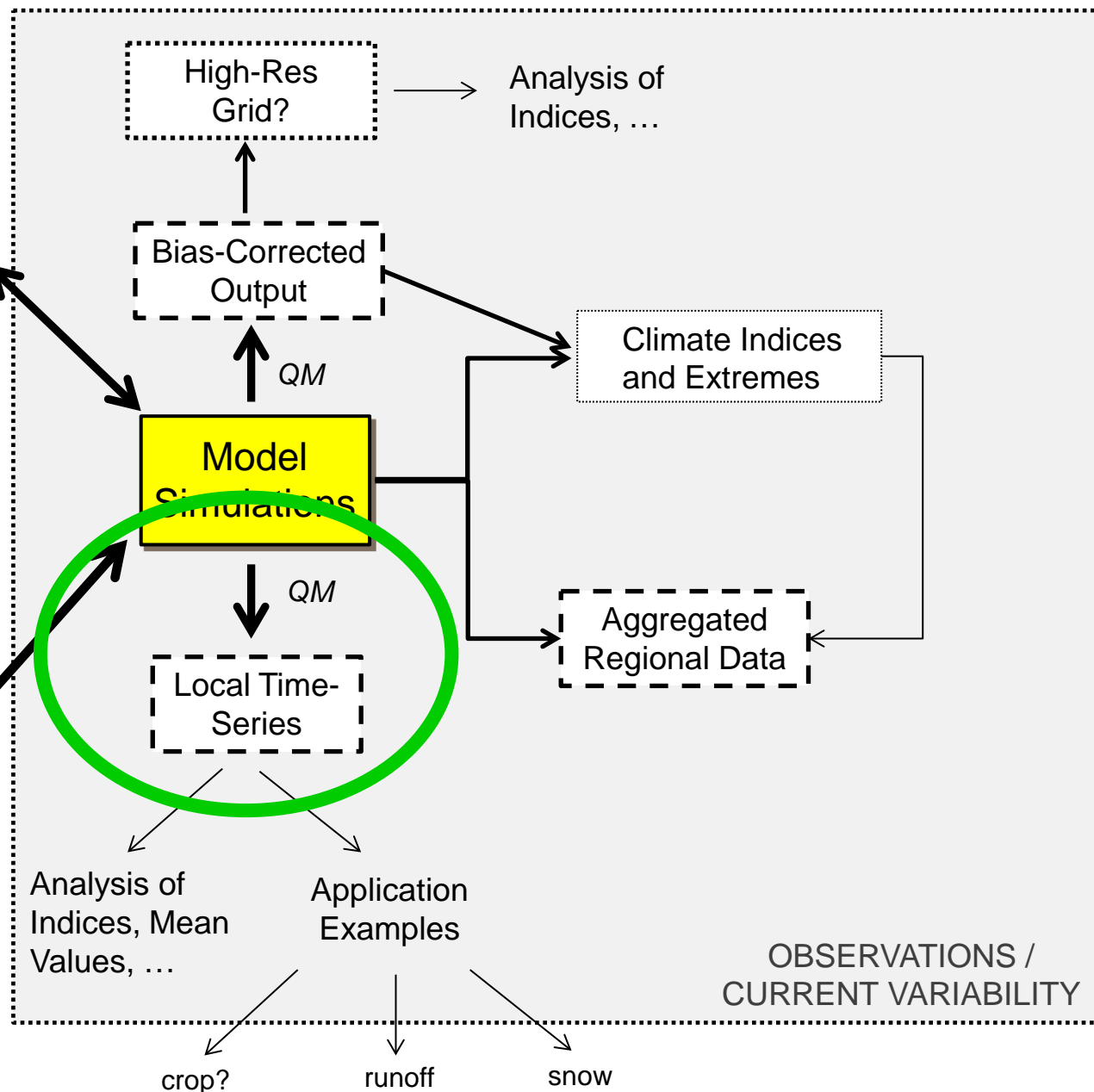


Model selection



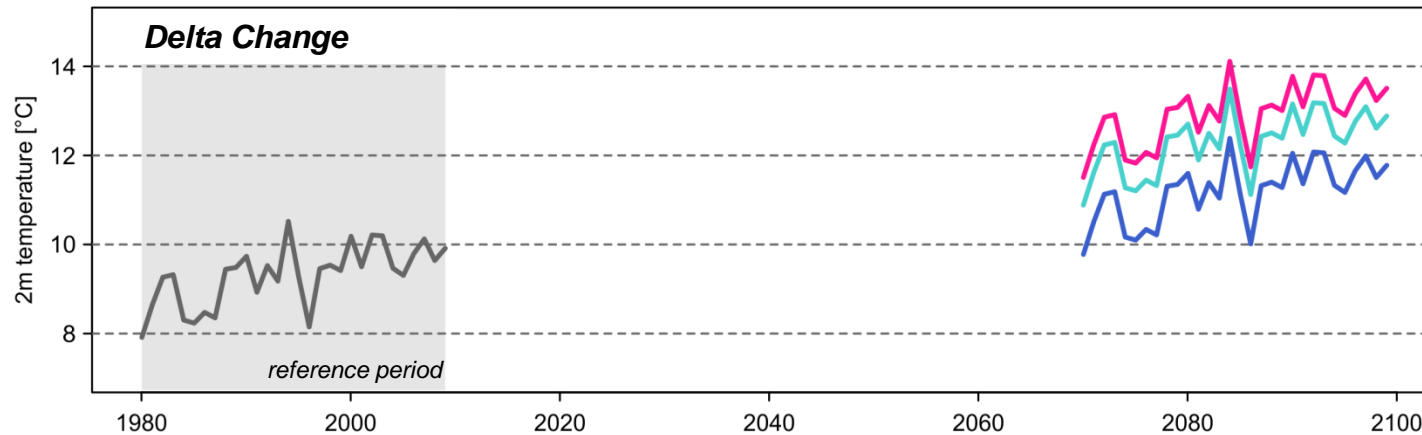
Scenario selection

**Basis**





# Improved Downscaling



**CH2018**

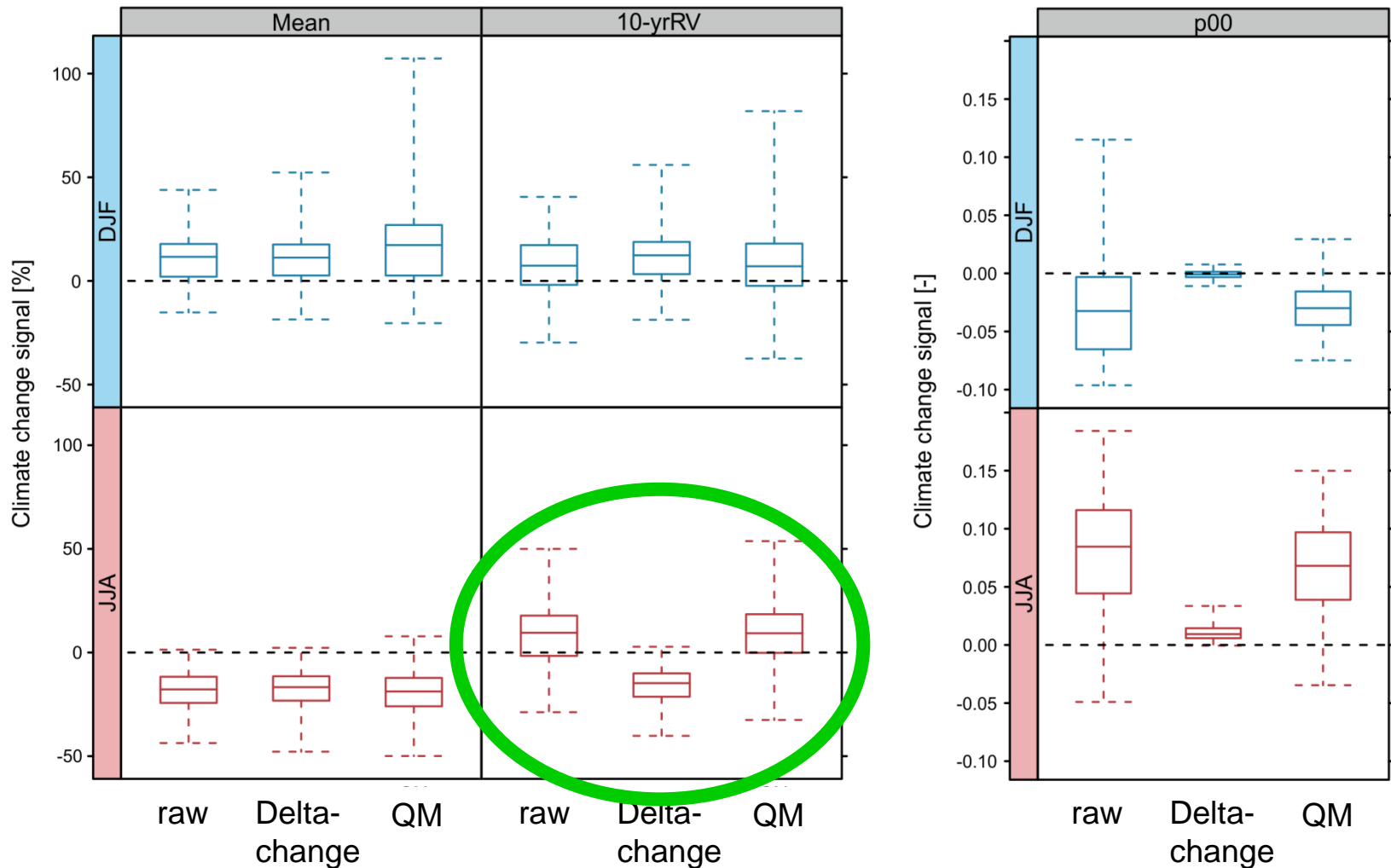
under  evaluation...

## Advantages

- ✓ Transient series
- ✓ Includes changes in interannual/daily variability
- ✓ Different Evolutions of future weather
- Representation of Extremes?



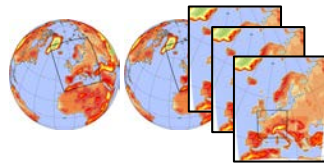
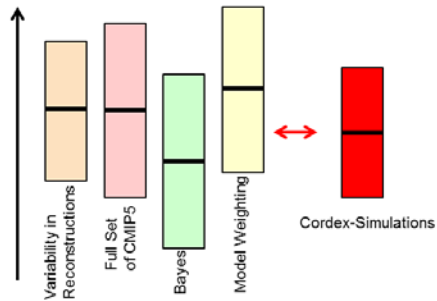
# Method-Intercomparison



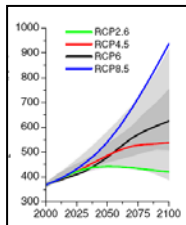
# Methodological Approach



## Uncertainty Assessment

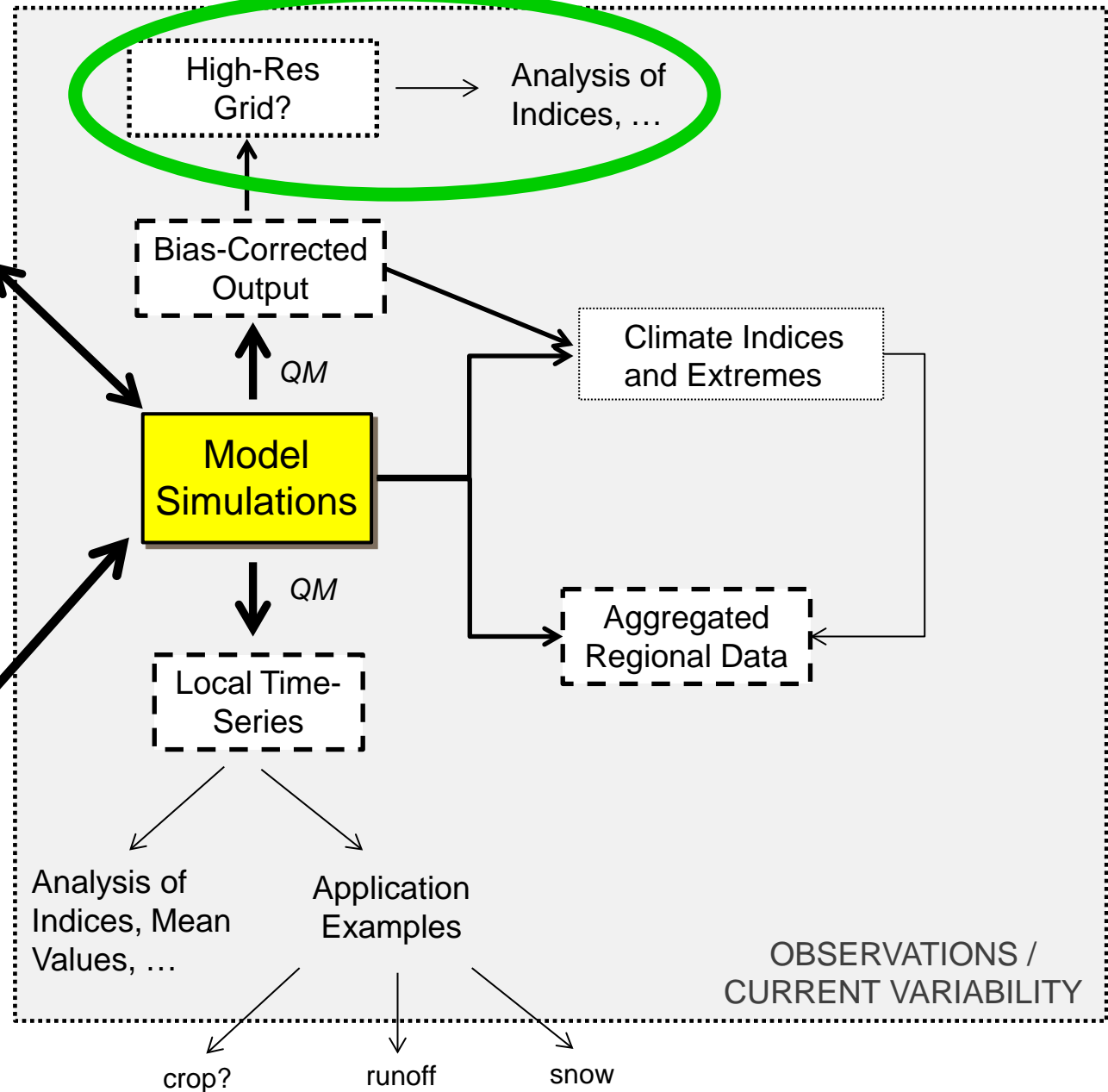


Model selection



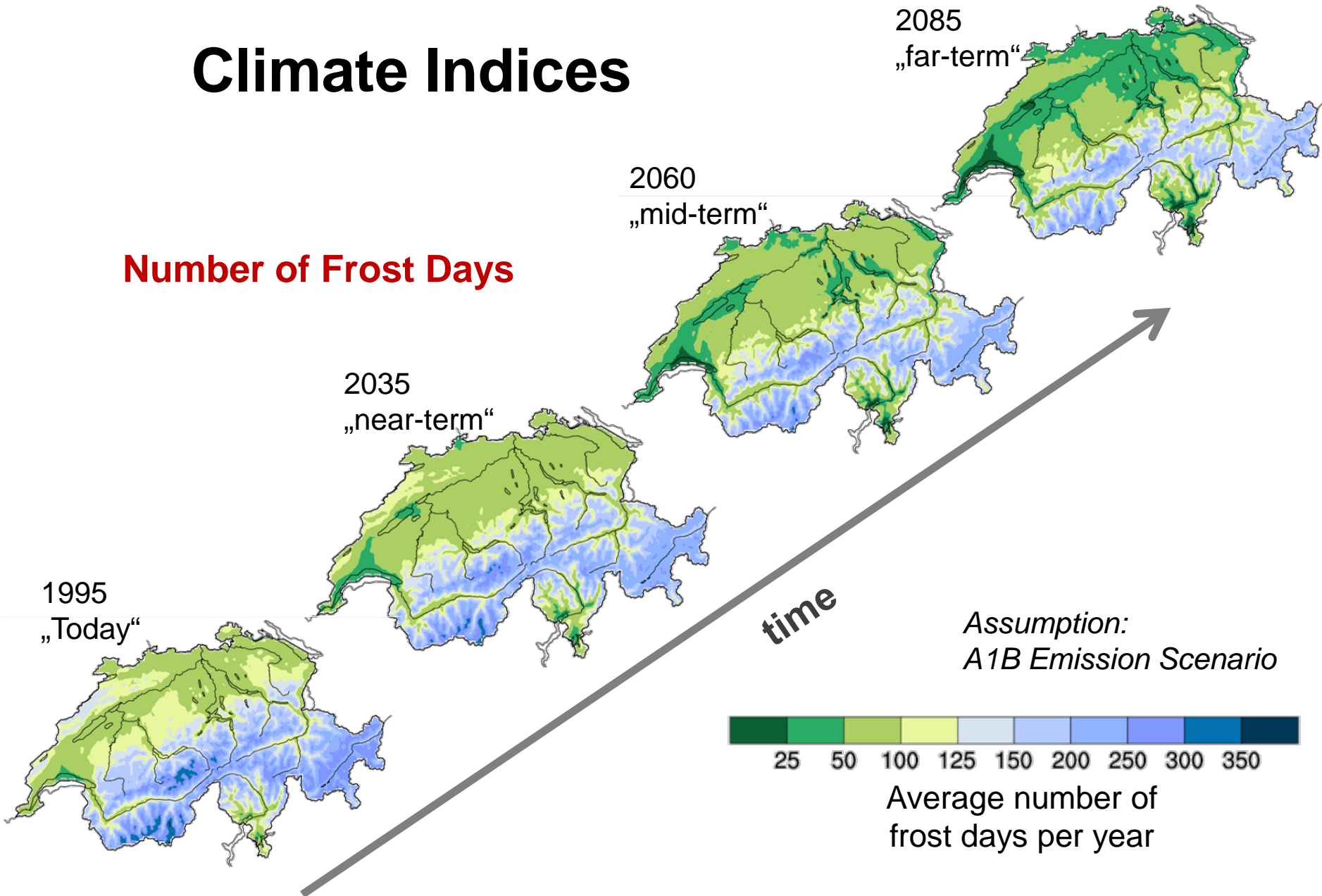
Scenario selection

**Basis**



# Climate Indices

## Number of Frost Days

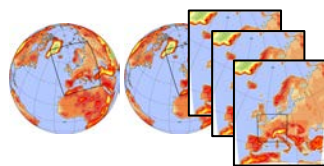
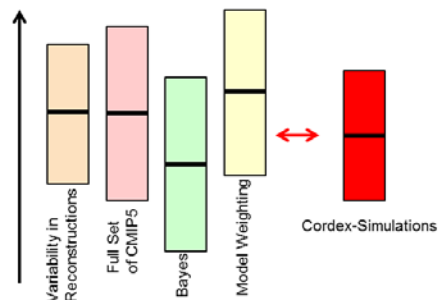


(Zubler et al. 2014)

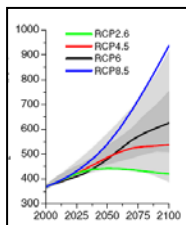
# Methodological Approach



## Uncertainty Assessment

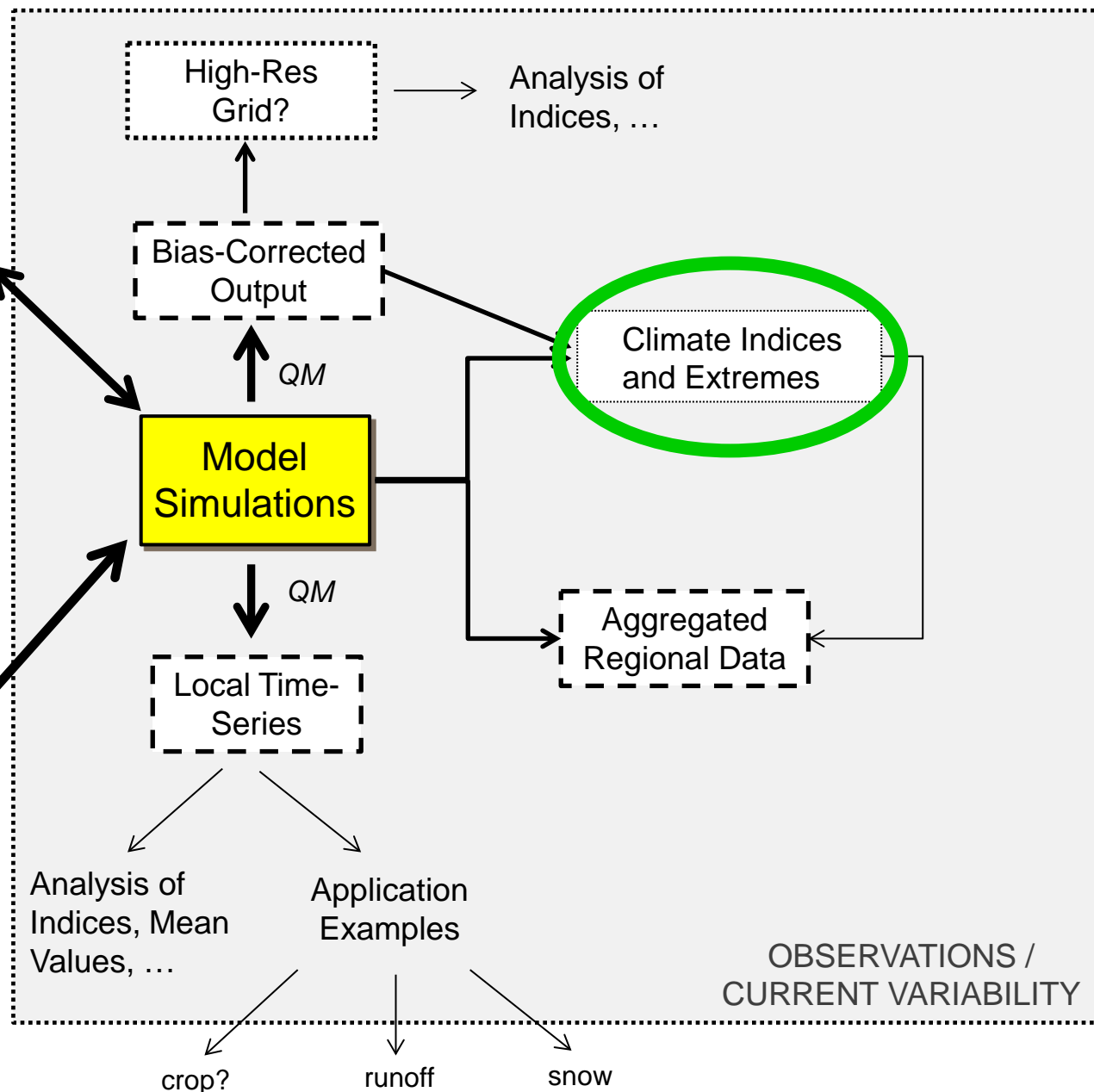


Model selection



Scenario selection

**Basis**

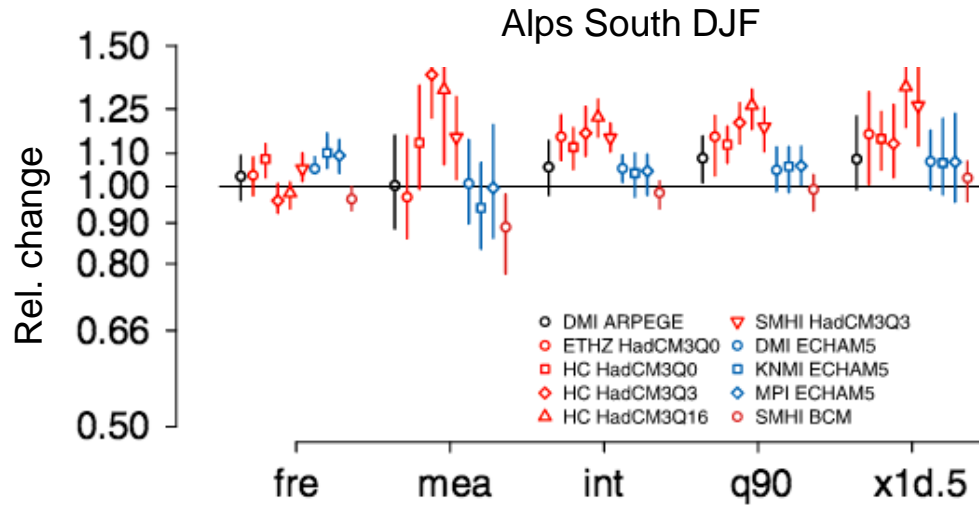






# Extreme Changes

## Extreme Precipitation



### In CH2018

- Generally more quantitative information on extremes to be expected
- Focus: precipitation and temperature extremes
- Information on ~40 different climate indices planned

(Rajczak et al. 2016; Schär et al.)



# Conclusions

**CH2011**



**CH2018**

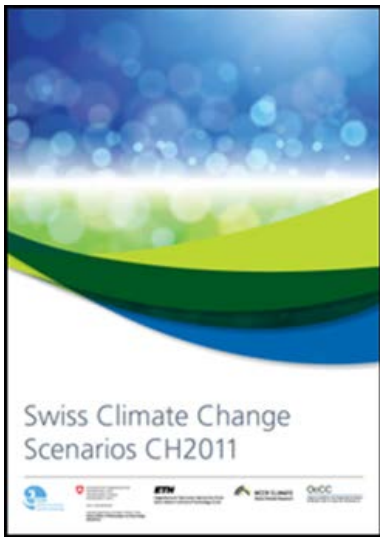


	CH2011	CH2018
<b>Model Databasis</b>	ENSEMBLES (A1B, @25km) 20 Simulations	CORDEX (RCP2.6/4.5/8.5, @12/50km) > 40 Simulations (for RCP8.5)
<b>T/P – Extremes</b>	Qualitative	Quantitative
<b>Downscaling</b>	Delta Changes	Quantile Mapping
<b>Variables</b>	<div>CH2018 will be more than «just» an update of CH2011 with new climate model simulations!</div>	
<b>Including Observations</b>	no	yes
<b>Integrating User Needs</b>	no	yes
<b>Dissemination Channels</b>	Report / Summary	Report / Brochure / Website



# Thank you!

[www.ch2011.ch](http://www.ch2011.ch)



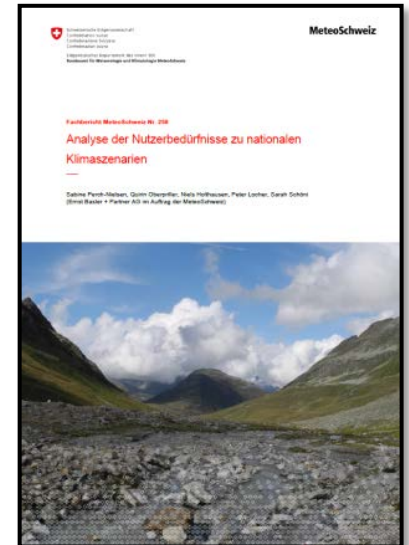
[www.nccs.ch](http://www.nccs.ch)



[www.ch2018.ch](http://www.ch2018.ch)  
(coming soon..)



*Meteoswiss Report  
on end-user needs*





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Swiss Confederation

Federal Department of Home Affairs FDHA  
**Federal Office of Meteorology and Climatology MeteoSwiss**

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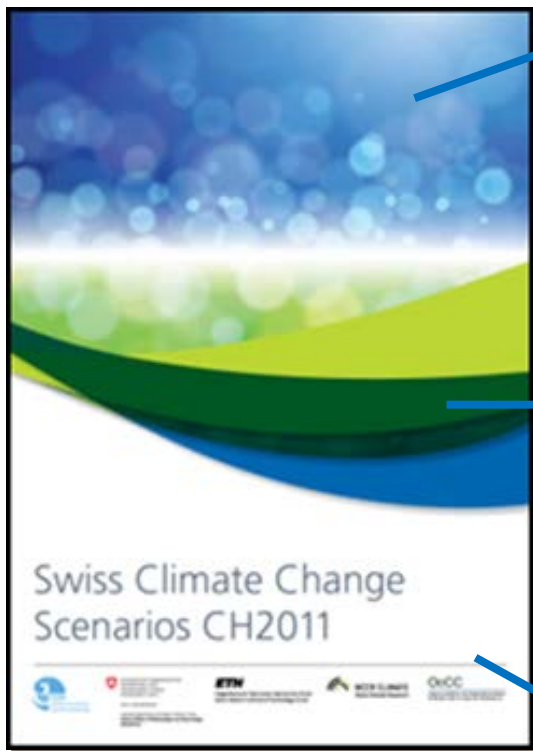
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CH-1211 Genève 2  
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[www.meteosuisse.ch](http://www.meteosuisse.ch)

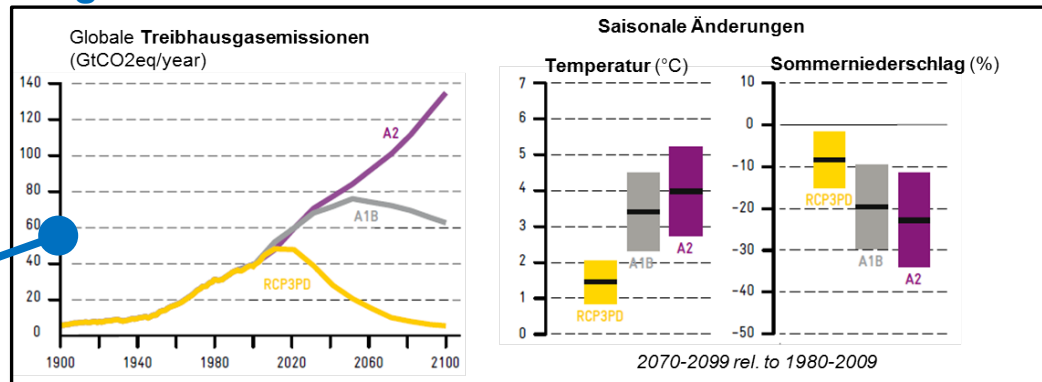
### **MétéoSuisse**

Chemin de l'Aérologie  
CH-1530 Payerne  
T +41 58 460 94 44  
[www.meteosuisse.ch](http://www.meteosuisse.ch)

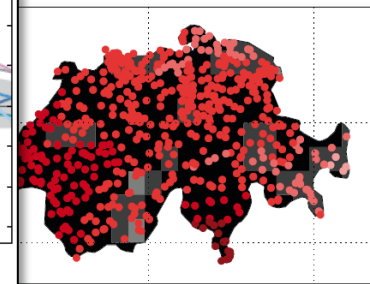
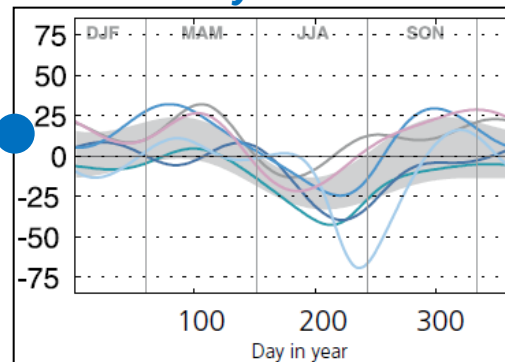
# CH2011



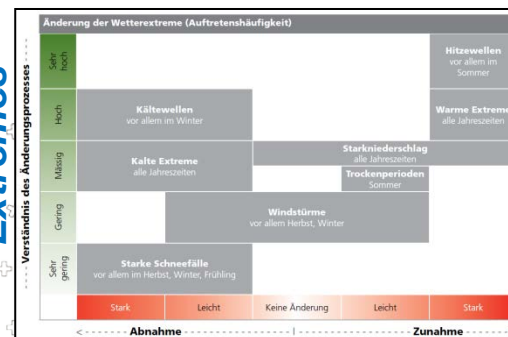
## Regional / Seasonal



## Local / Daily



## Extremes



MeteoSwiss

Dreas Fischer

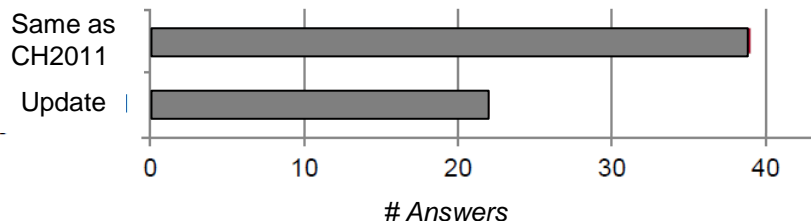


# Time Periods

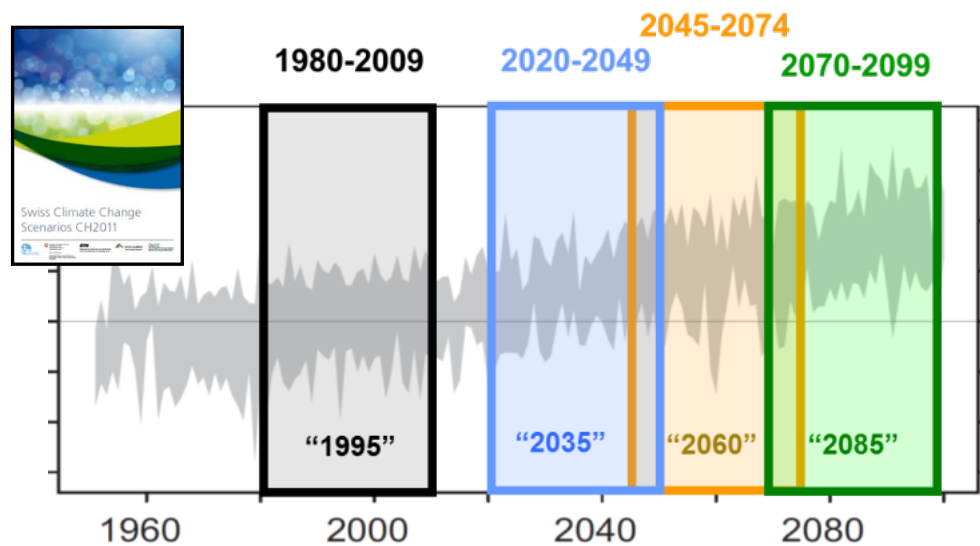
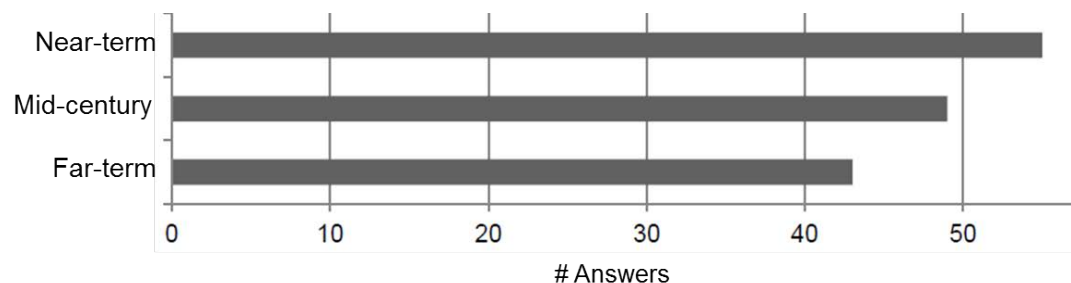


User Survey, MeteoSwiss 2016

## Reference Period?



## Future Periods?



The **same as in CH2011**, but Reference Period shifted to 1981-2010 (official norm period)

- ✓ Comparability with CH2011
- ✓ Link to climate analyses for current norm period
- ✓ 21st century fully covered

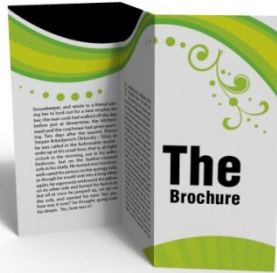


# Concept of Dissemination



## Web

- Integrated into **NCCS-Web**
- Display of climate change information
- Emphasis on Guidance
- Data Access



## Brochure

- In Swiss Languages
- Presents the **main findings** of CH2018
- Reviewed by a stakeholder group
- Layouted
- Printed



## Technical Report

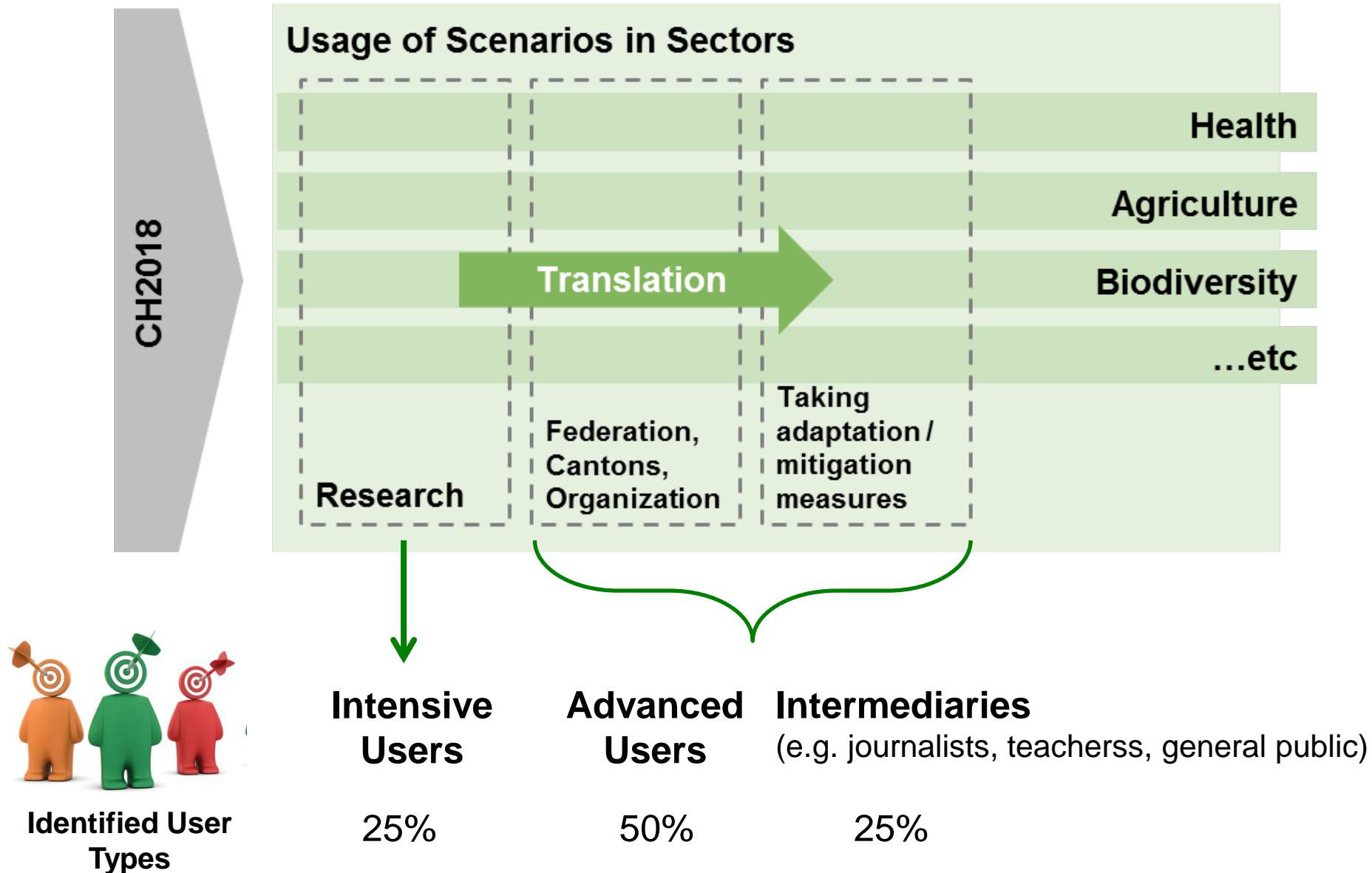
- In English
- **Methodology** and Results in detail
- Reviewed by scientists
- Not Layouted
- Not Printed

# Sector-specific climate information

Sector	Index
Agriculture	Frost days Growing season length & beginning Huglin-Index (wine production)
Infrastructure	Frost-thaw days
Health	Tropical nights Hot days
Tourism	Days with fresh snow Summer days
Energy	Heating degree days Heating days Cooling degree days Cooling days
Permafrost & glaciers	Ice days Positive degree days

(Zubler et al. 2014)

# User Landscape



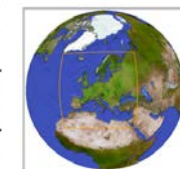


# Multi-Model Analyses

## CH2018 Model Database

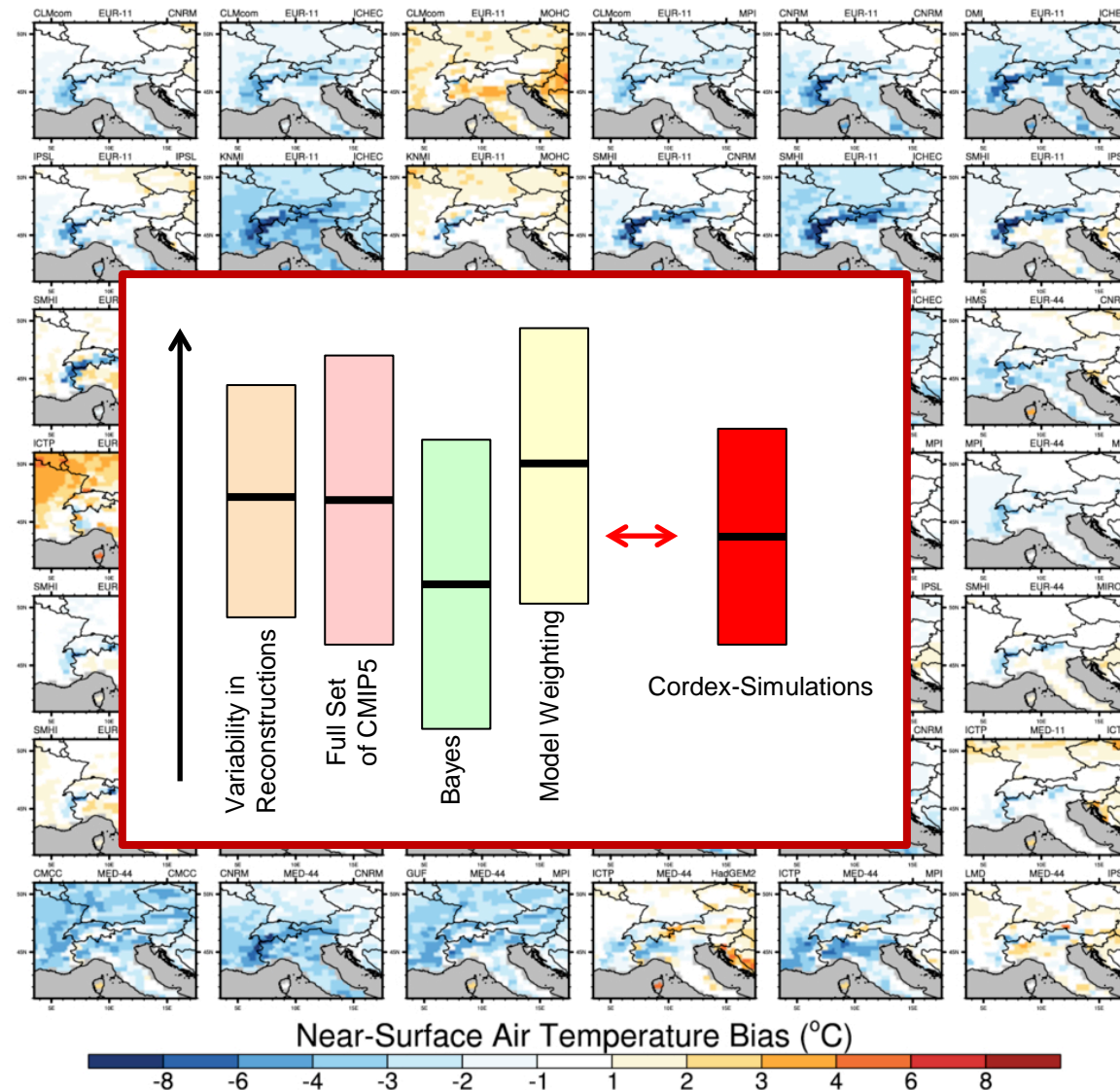
- Includes Regional Climate Model simulations at **higher spatial resolution** than CH2011
- **Higher number** of simulations
- Involves **latest generation of global models** (used for IPCC AR5)

→ *Bias-correction*  
→ *Uncertainty Analysis*



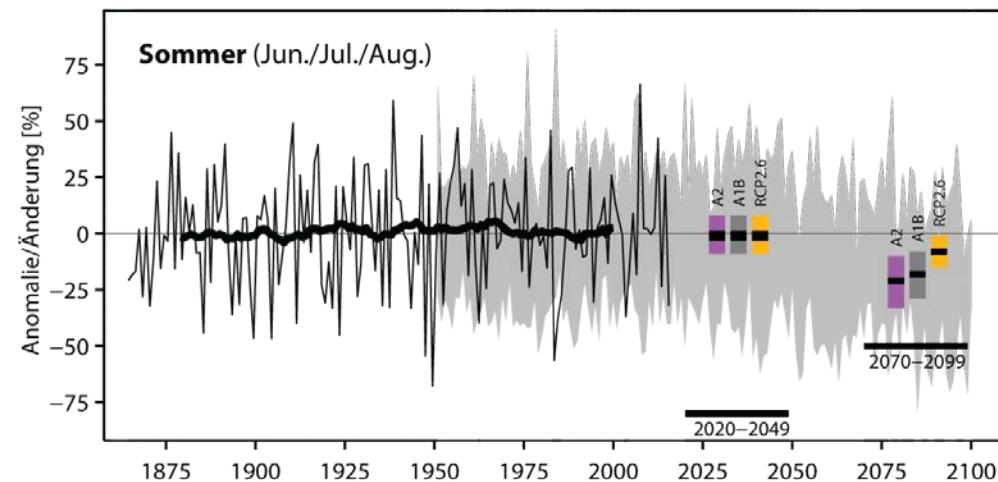
European Domain

*Zubler et al.*  
*Knutti et al.*





# Observations / Variability



In CH2018

- Aim: **interpret the scenarios** with respect to Swiss climate observations
- How do the changes relate to the **mean climate state**?
- How do the changes relate to **natural variability**?  
If possible: guidance for the next 10-20 years
- Provision of **absolute values** for a future climate

(Scherrer et al.)