Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

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

user needs from the perspective of a national weather service

Mark Liniger, Andreas Fischer
Christof Appenzeller, Mischa Croci-Maspoli, Sophie Fukutome, Elias Zubler

CH2011 and beyond

C2SM Center for Climate Systems Modeling

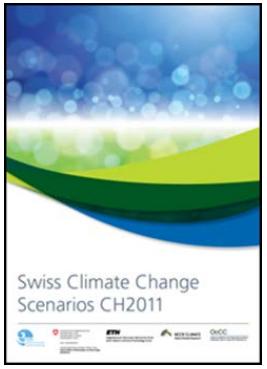
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

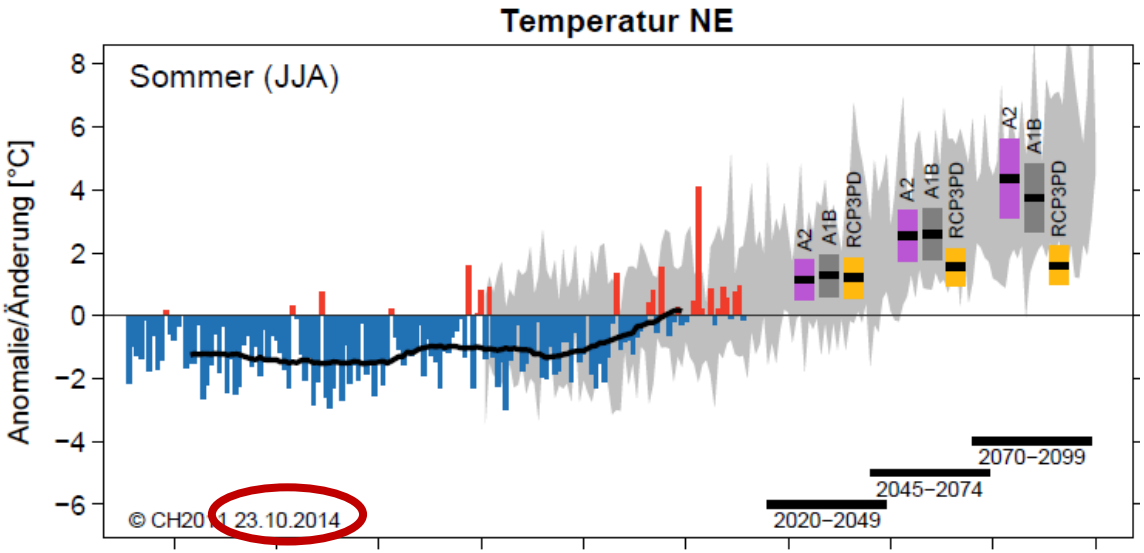
Eidgenössisches Departement des Innern EDI
Bundesamt für Meteorologie und Klimatologie
MeteoSchweiz

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

NCCR CLIMATE
Swiss Climate Research

OcCC
Organe consultatif sur les changements climatiques
Beratendes Organ für Fragen der Klimaänderung

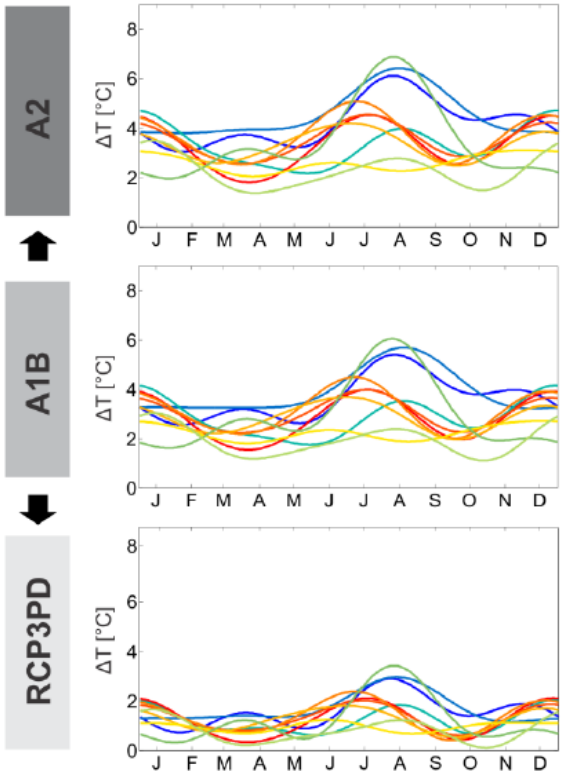




Release am 28. September 2011
www.ch2011.ch

CH2011 Extensions in prep based on user feedback

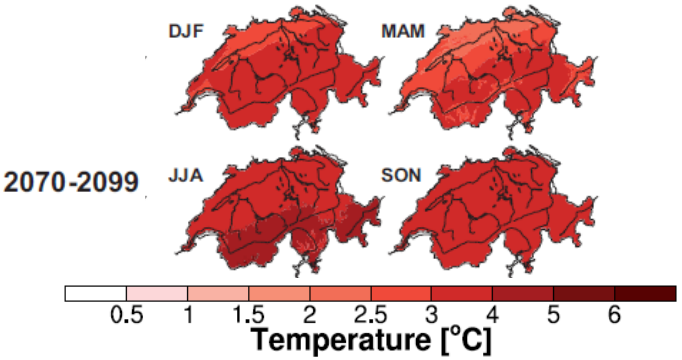
- Daily delta-change station series for other scenarios?
  - Bosshard et al.
- How to combine seasonal changes?
  - Fischer et al.
- Alpine regions? Transient changes?
  - Fischer et al.
- Extreme precipitation?
  - Rajczak & Schär



Bosshard et al.

User specific indices for CH2014 Impacts - Study

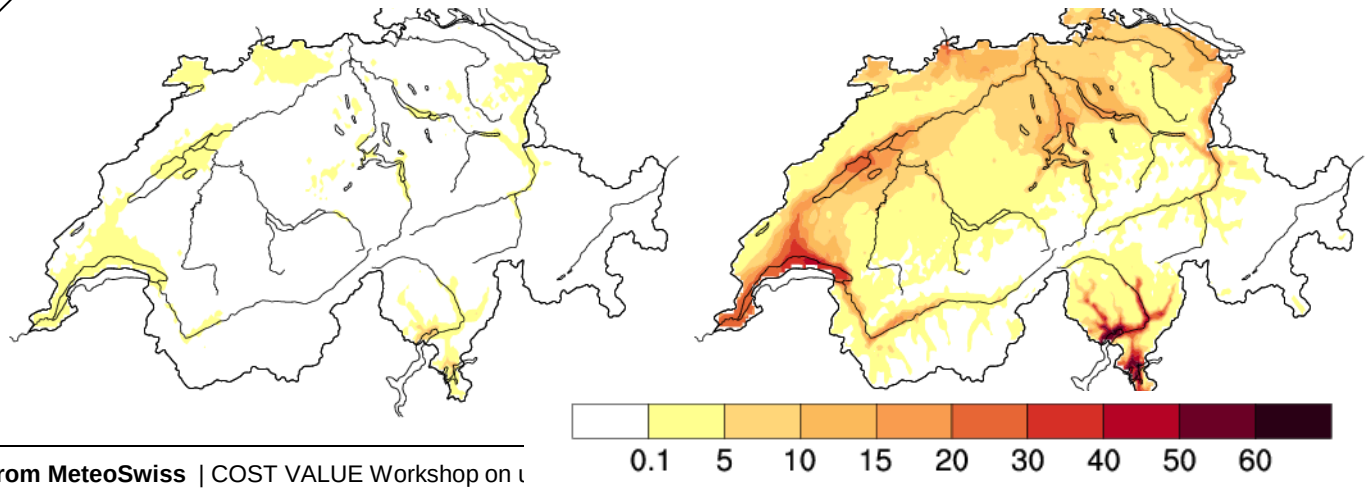
Spatial disaggregation



temporal disaggregation
delta change on
gridded daily obs

Heute
(1980-2009)

A1B-Scenario
(2070-2099)



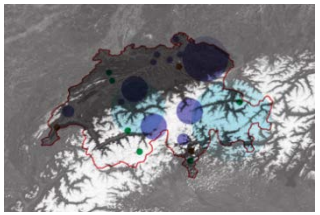
Tropical nights / year
(T_{min} ≥ 20°C)

Zubler et al., (2014a, b)

CH2014-Impacts

CH2014-Impacts

TOWARD QUANTITATIVE SCENARIOS OF CLIMATE CHANGE IMPACTS IN SWITZERLAND



- Coordinated national effort to calculate quantitative scenarios of climate impacts
- **CH2011 Scenario Data** as common basis
- Different Sectors: Hydrosphere, Cryosphere, Agriculture, Forests, Biodiversity, Health, Energy
- Released in March 2014

UNIVERSITÄT BERN

OESCHGER CENTRE CLIMATE CHANGE RESEARCH

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Home Affairs FDHA
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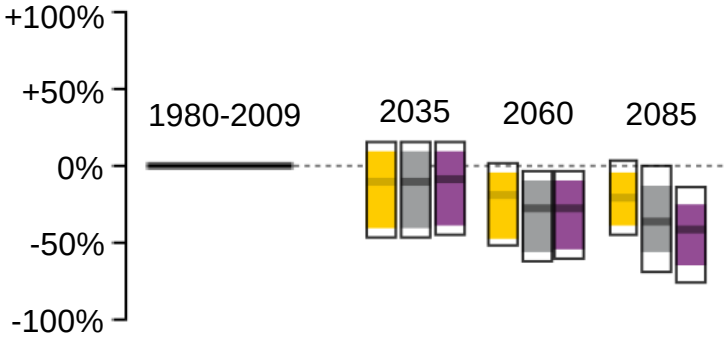
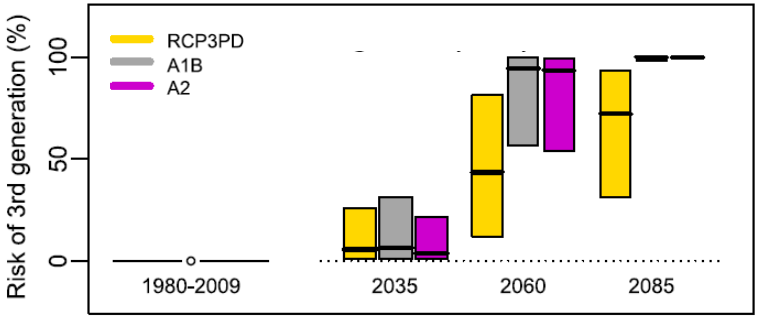
NCCR CLIMATE
Swiss Climate Research

Example 1:
Projected Summer Runoff (Emme)

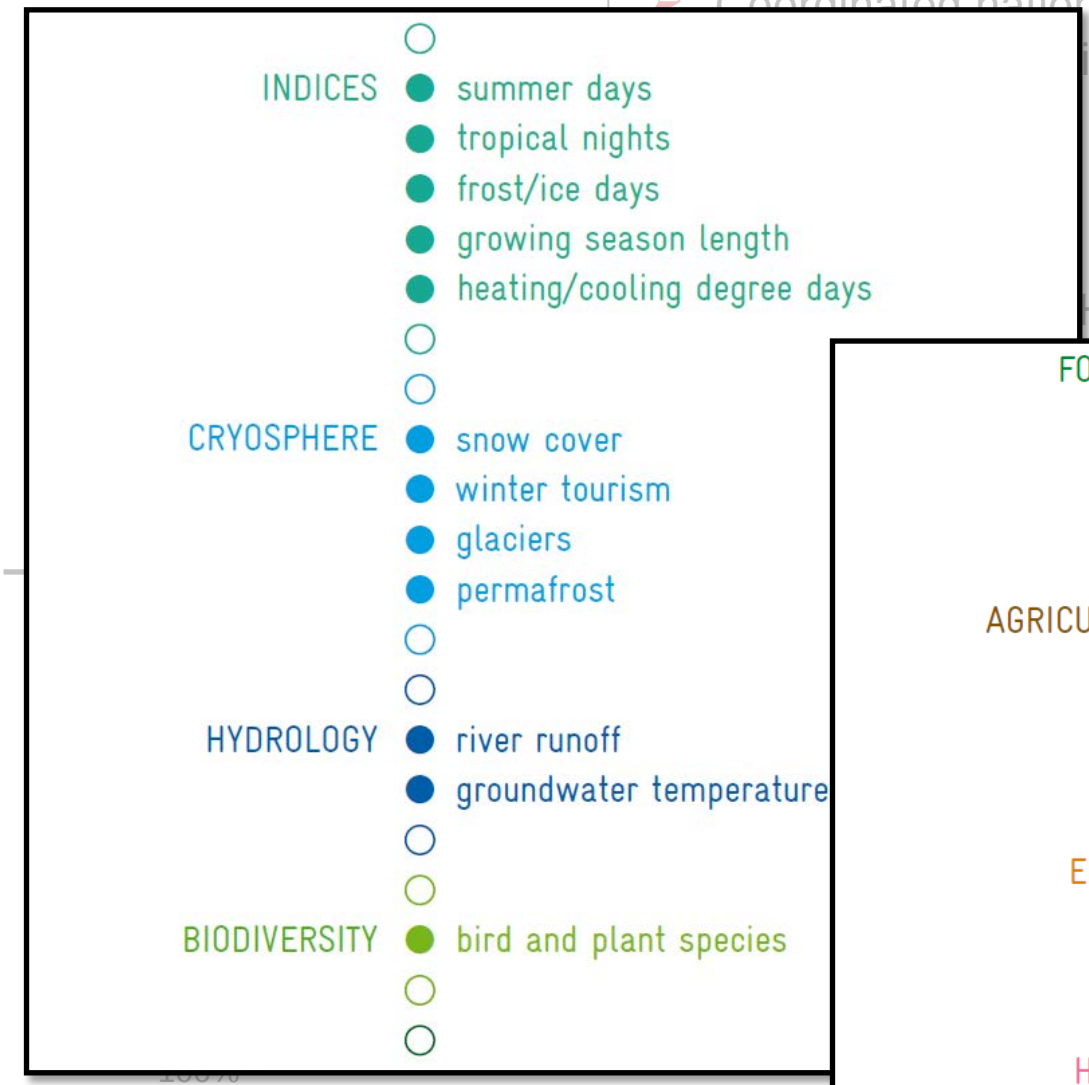


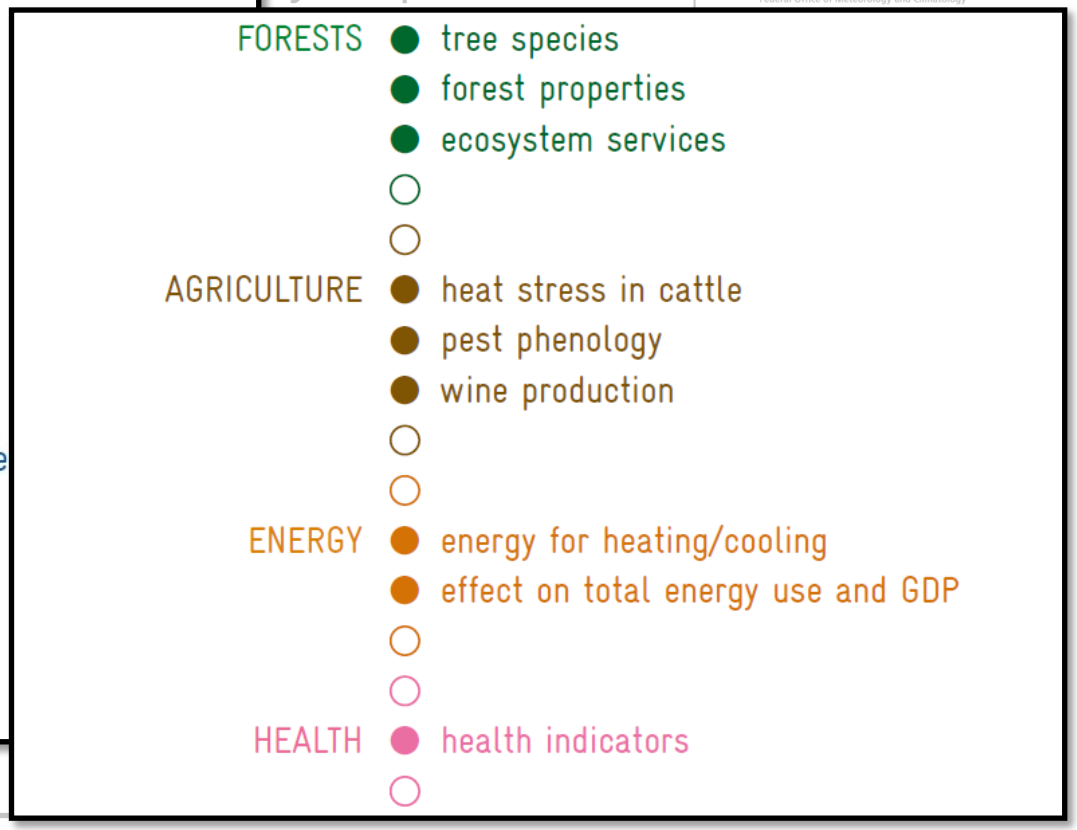
Example 2:
Risk 3rd Generation Codling Moth



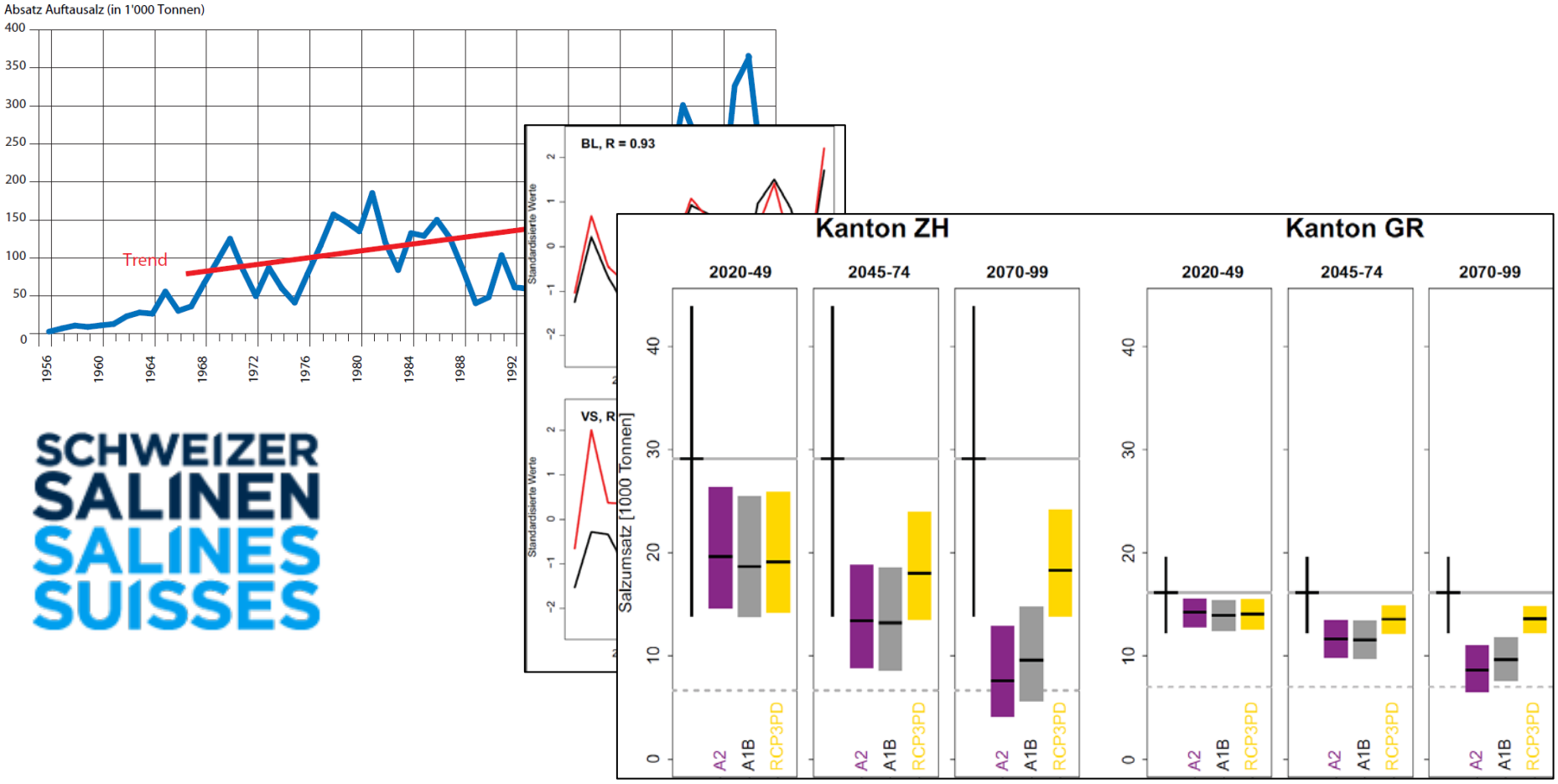
CH2014-Impacts

- Coordinated national effort to
- ive scenarios of
- **Data** as common
- Hydrosphere,





Example:
Future road salt use in Switzerland

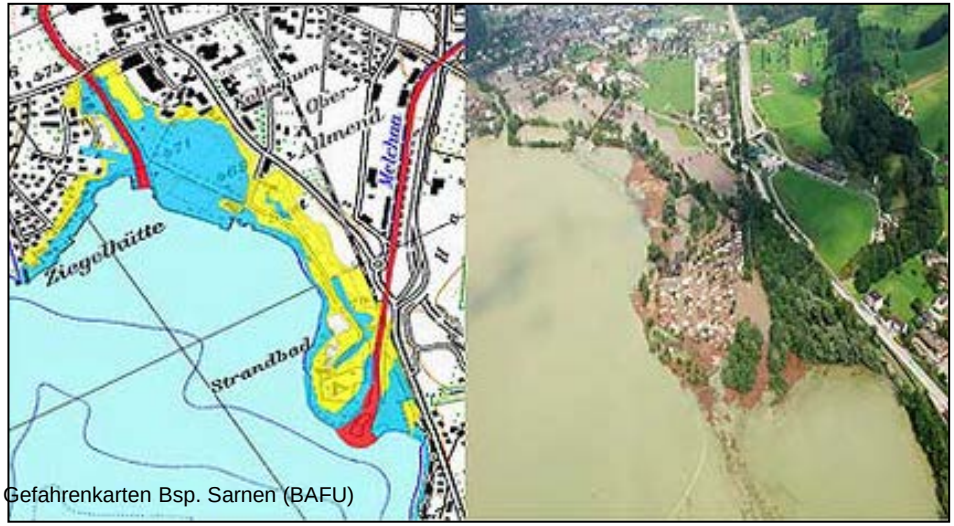


SCHWEIZER SALINEN
SALINES SUISSES

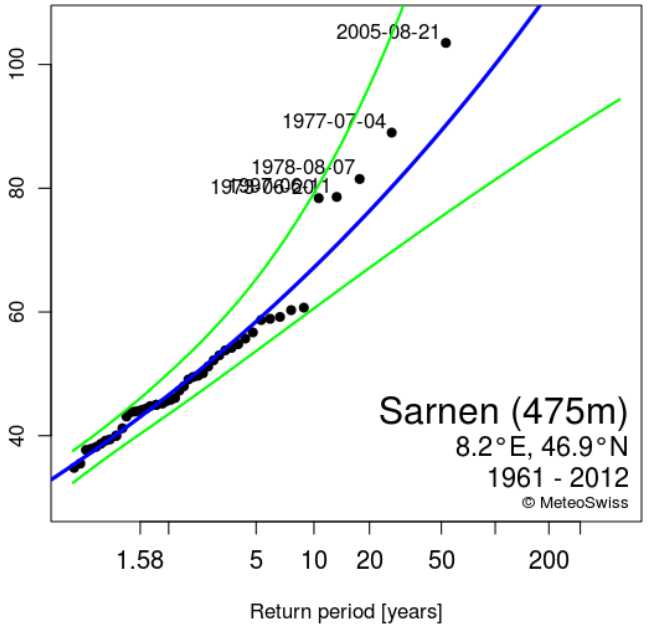
Zubler et al. (in press)

Project Niederschlagsextreme

BAFU + MeteoSchweiz with various Stakeholders



Gefahrenkarten Bsp. Sarnen (BAFU)



Return values of extreme precipitation
«blauen Bände» (Zeller, Geiger, Röthlisberger, 1976-1992, WSL)

- Research and development
- Continuous update and operation
- Implementation and **user interface**

  → Market research with 12 interviews (each 1 hour) with stakeholders of engineering offices, administration, energy companies, insurance

www.meteoswiss.admin.ch/web/en/research/current_projects/climate/extremniederschlaege.html

RESULTS

Two separate Online-Modules

Basic	Pro
▪ Simple and fast presentation of specific extreme-value-analysis results ▪ Search functionality ▪ Catalogue of Top10 events ▪ Output as simple values, diagrams, PDF with summary results.	▪ Ability to work with raw data ▪ Import function of user data, analysis of time series, extreme value statistics. ▪ High flexibility and individuality in use ▪ High level analysis by MeteoSwiss on issues like trends, cycles, etc. ▪ Background information on station history etc. ▪ Tutorials, training, etc.

→ Webportal

→ Toolbox (long-term)

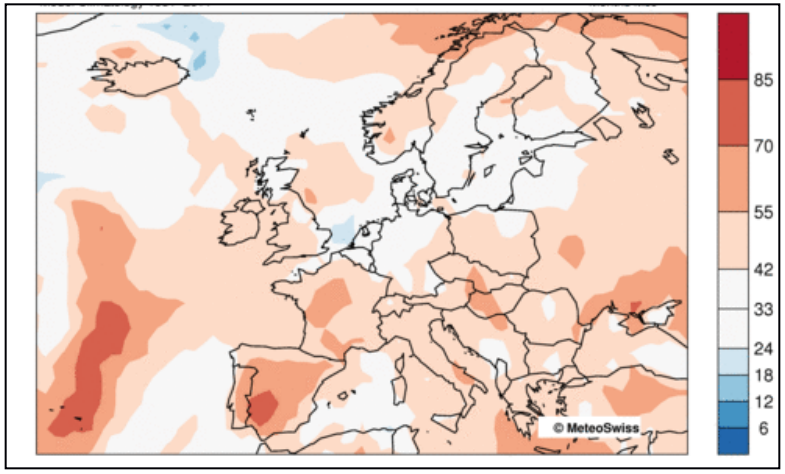
The EUPORIAS project

Slides by Marta Bruno Soares m.soares@leeds.ac.uk

EUPORIAS

UNIVERSITY OF LEEDS

- EUPORIAS: **EU**ropean **P**rovision **O**f **R**egional **I**mpact **A**ssessment on a **S**easonal-to-decadal timescales;
- Co-production between producers and users of prototypes of climate impact prediction services on seasonal to decadal (S2D) timescales (a month up to a year; 2 to 10 years);
- Led by UK Met Office; 24 partners (incl. MeteoSwiss), 15 WPs, 60+ stakeholders.
- More information: www.euporias.eu



Seasonal forecast: 3-monthly mean temperature to be above average conditions for temperatures from May to July 2012.

Source: MeteoSwiss

EUPORIAS

SEVENTH FRAMEWORK PROGRAMME

WP12: Assessing users' needs

Report on results in prep

EUPORIAS

UNIVERSITY OF LEEDS

- Assess users' needs with regard to S2D climate predictions across European sectors (e.g. energy, agriculture, water, health, transport);
- 16 partners led by the University of Leeds: UoL, UK Met Office, TEC, IC3, ENEA, Predictia, AEMET, UC, MeteoSwiss, UL-IDL, ULund, CETaqua, IPMA, WHO, EDF, Meteo-Ro, SMHI
- Interviews with EUPORIAS stakeholders and other users – 80 interviews across 16 European countries.
  - Mainly private companies & government organisations
  - Mainly on the energy, agriculture, transport, and water sectors
  - Larger companies (i.e. ≥ 1,000 employees)

But sample not representative of sectors or Europe!

Use of weather and climate data

Report on results in prep

EUPORIAS

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Sector (n=interviews)	Historical data/past observations	Weather forecasts (up to 1 month)	Seasonal forecasts	Climate change projections/ scenarios
Energy (n=14)	xxxxxxxxxx	xxxxx	xxxxxx	xx
Agriculture (n=12)	xxxxx	xxxxxxxx	xxxx	xxx
Transport & emergency services (n=12)	xxxxxxx	xxxxxxxxxxx	xxxx	xxxxxx
Water (n=10)	xxxxxx	xxxxxxxxx	xxxxxx	xxxxxxx
Tourism (n=9)	x	xx		
Health (n=8)	xxx	xxxxxx	xx	xxxxx
Forestry (n=5)	xx	xxxx		x
Insurance (n=5)	xx	xxx	xxx	x
Other (n=4)	xx	xxx	x	xxxx

Note: Each cross corresponds to an organisation using that type of weather/climate information.

Use of weather and climate data

Report on results in prep

UNIVERSITY OF LEEDS

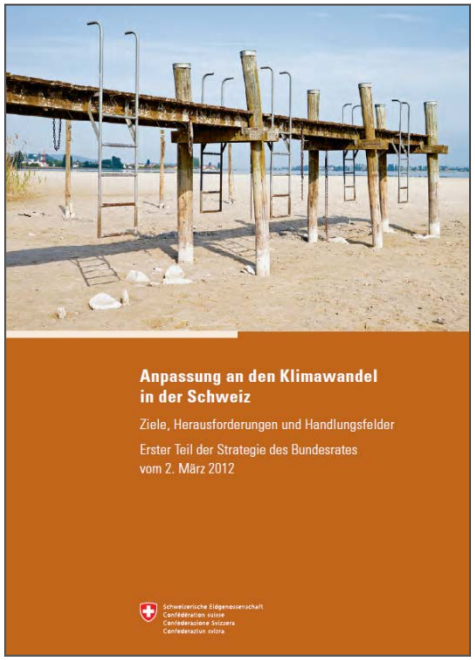
- Type of data – most used are weather forecasts; historical data used to understand climate variability/feed models/forecast future conditions; CC scenarios used to plan impacts or capital investment;
- Main parameters – precipitation (rainfall), temperature, and wind; other included solar radiation, snowfall, frost, & humidity;
- Post-processing – many process data in house (n=21), others outsource (n=11), and some do both (n=13);
- Climate information indices – few use it; mostly related to temperature (e.g. HDD,GDD) & precipitation (e.g. SPI);
- Main sources – National Met Services; other sources include research institutes, government agencies, own data, and ECMWF;
- Larger organisations tend to use more types of information.

Political recognition of climate adaption needs

Adoption of “Aktionsplan Anpassung an den Klimawandel” by federal council in April 2014

Regular update of regional climate scenarios for Switzerland

- **Coordination** in close collaboration with experts of academic sector.
- **Regionalization** for specific locations and sectoral needs.
- Communication and **dissemination** of scenarios and corresponding infrastructure.



Climate adaptation plan by Swiss Government: challenges across sectors

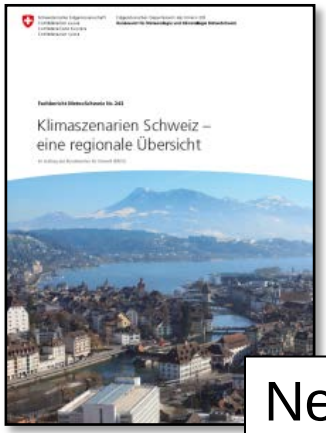
	Water	Natural disasters	Agriculture	Forestry	Energy	Tourism	Biodiversity	Health	Spatial development
1. Heat					■		■	■	■
2. Summer droughts	■		■	■	■		■		
3. Flooding	■	■	■	■	■		■		■
4. Mass movements	■	■	■	■	■		■		■
5. Snow line	■	■	■	■	■	■	■		
6. Water, soil, air quality	■		■	■	■		■		
7. Ecosystem changes	■		■	■			■		
8. Spreading of diseases			■	■			■	■	
9. Monitoring, early warnings	alle Sektoren								
10. Uncertainties, knowledge gaps	alle Sektoren								
11. Information	alle Sektoren								
12. Ressources, finance	alle Sektoren								

Swiss Federal Office for the Environment (2014)

How to go onwards?

(ETH, MeteoSwiss, ProClim, et al.)

CH2011



(BAFU Regionale Klimaszenarienb

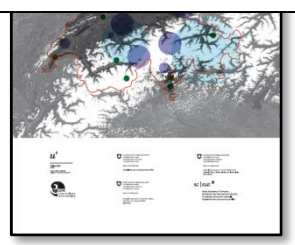
NCCS

CH20xx

Next steps

- Brainstorming with small group of experts based on the experience from CH2011
- “Market” research on user needs on climate change scenarios

(BAFU Anpassungsstrategie,)



(Oeschger Centre et al.)

Conclusions

- Understanding the world of the users is important.
  - Everybody has to learn about the others.
  - opening new research questions.
- Service development is not a top-down design, but messy and highly interactive.
  - Outcomes can differ significantly from what has been planed at the beginning.
  - There is no “solution to everything”

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