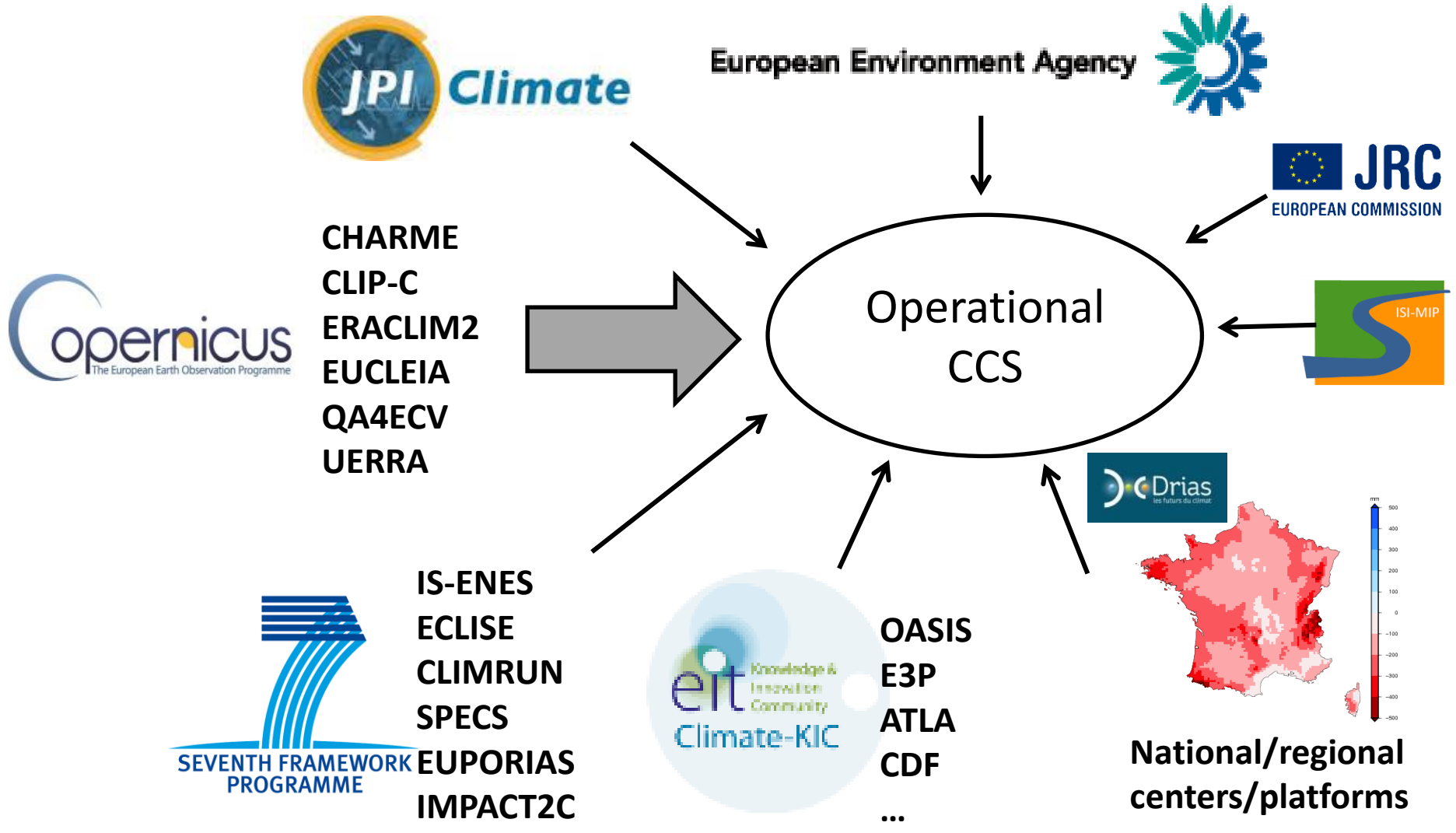
Sectoral Information System User requirements

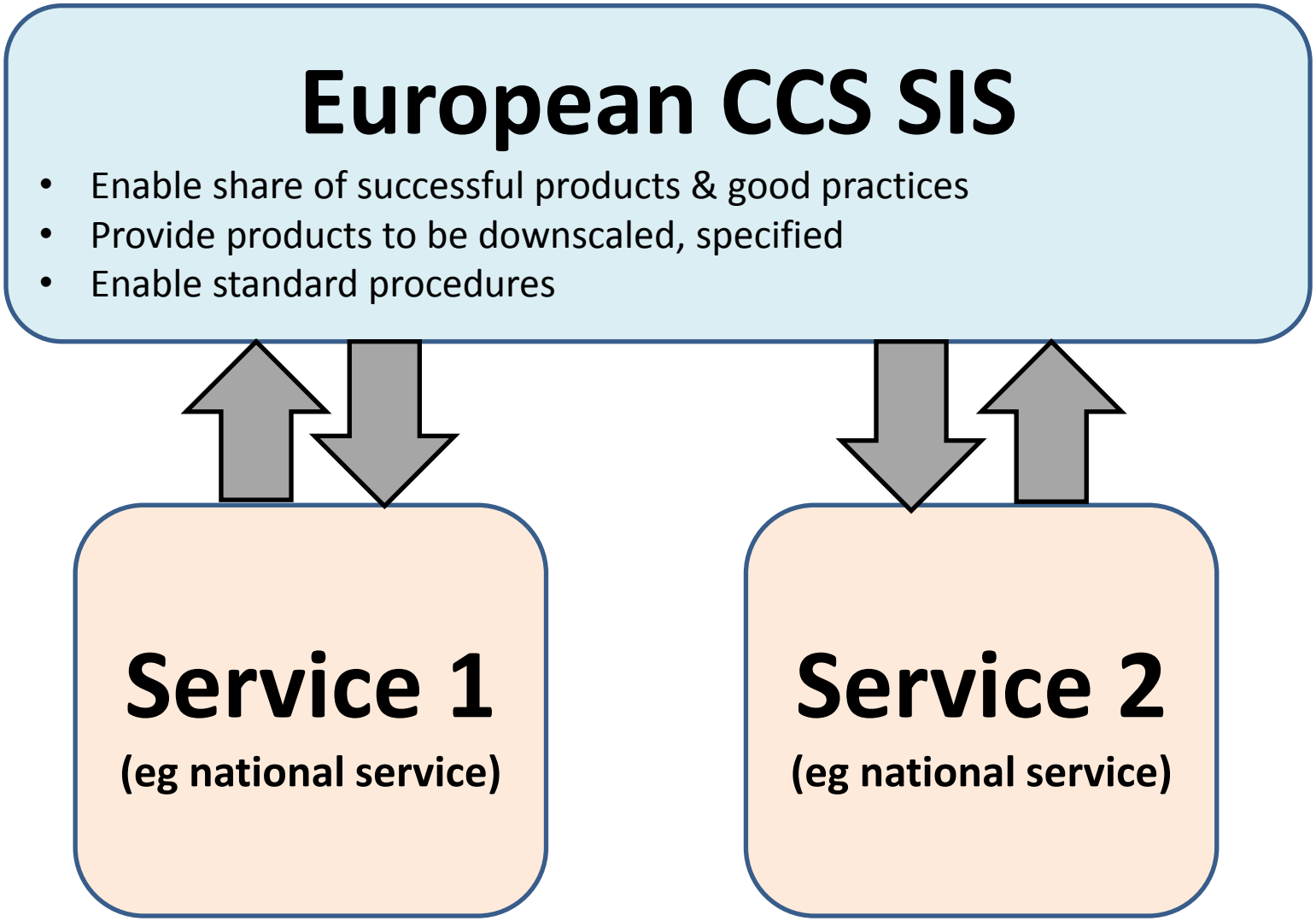
Robert Vautard

IPSL (with help of many colleagues)

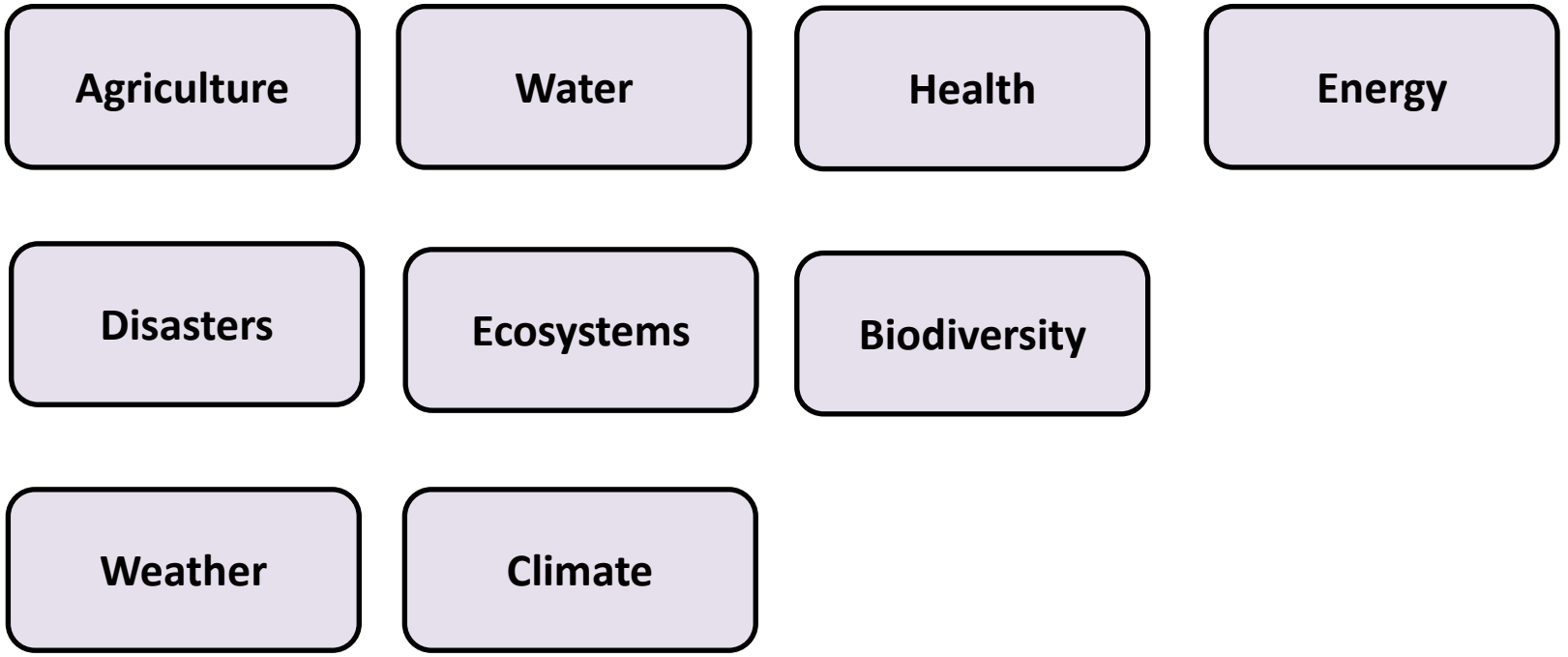
We do not start from scratch in user requirement analysis



Added Value of a CCS SIS



Societal Benefit Areas



Issues

- 8 sectors needed (group or remove ?) → Discussion
- Land and marine instead of ecosystems/biodiversity ?
- How about : local authorities, infrastructure, cities, coasts, tourism?

Time scales

- Past data : Observations and Reanalyses
  - Taylored products, reference data sets
- Current events
- Seasonal forecasts
  - Tailored products for seasonal prediction
- Decadal forecasts
  - Research or operational in 3 years? Exploration necessary
- Climate projections
  - Taylored products for long-term investment

User needs: an interactive process

Inputs from EUPORIAS, SPECS, CLIMRUN, ECLISE, IMPACT2C, CLIMATE KIC, NATIONAL CENTERS

- **« Markets » or « needs » strong for short-term issues, weak but sometimes unknown for long-term issues**

- **Trust building & understanding user decisions is a key stage, takes time**
  - Case studies, prototyping activity essential
  - Building on successful operationnal activities
  - Write fact sheets, appropriate communication to convince decision makers
  - Need of quality measures, indicators

- **Products should be tailored and specific**
  - What level of tailoring should reach a european CCS relative to national?
  - How far does SIS go into cost assessment?

- **Need of involvement of social science and communication experts**
  - Spatialisation: language, culture issues

A synthesis of user expectations from JPI Climate & IS-ENES /CIRCLE2

- JPI Climate : “What do users ask for?

  In the analyzed documents most often information is given (very broad information up to detailed information) on the need for (% of the analyzed documents until now): impacts (67%), climate variables (68%), extremes (60%), current climate (60%), time horizon in the future (59%), spatial resolution (57%), accessibility of the data (56%) and guidance on the use of the data/information (51%).”

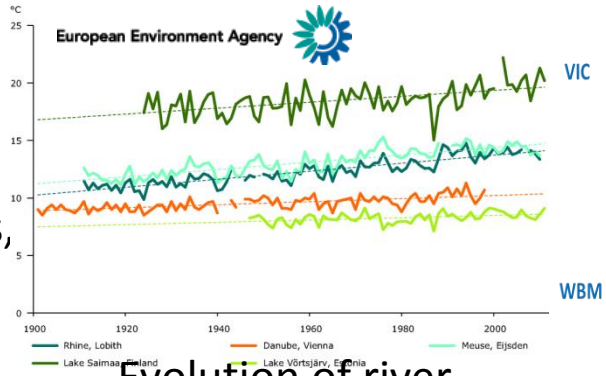
- From IS-ENES / CIRCLE2 / EEA
  - Climate indices, post-processing tools, bias correction, guidance, access to SSPs, LUSs, …

Product examples: (1) Energy

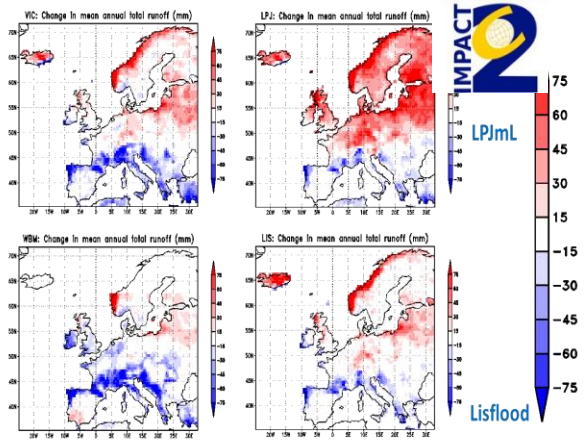
Users often well trained on climate issues

Needs

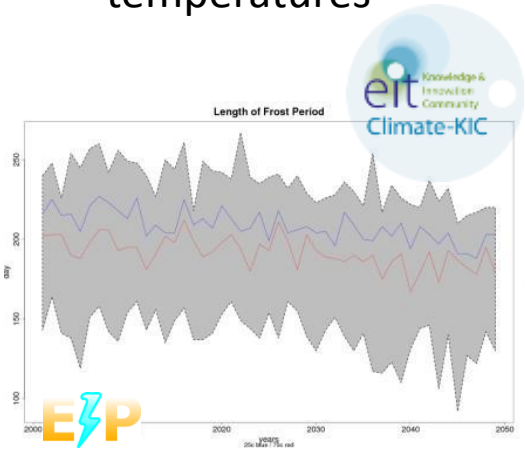
- Homogenized climate data sets, time series (full and events)
- Extreme events generation
- River discharge & temperature indices for cooling water, cold/hot spells for demand
- Resource, variability and predictability for renewables
- Seasonal forecasts for renewable resources (eg EUROSIP)



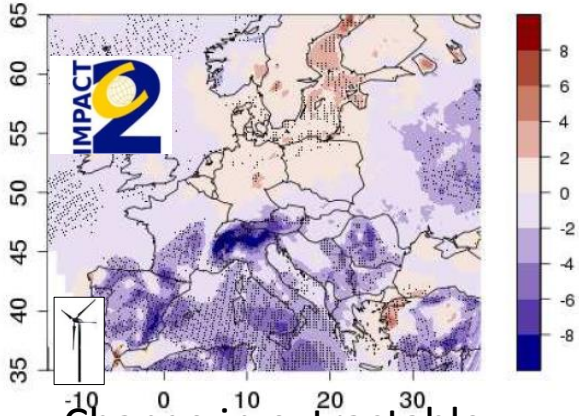
Evolution of river temperatures



Changes in hydrology



Evolution of frost period length



Change in extractable wind power 2050-present courtesy I Tobin IPSL

Advancing Renewable Energy with Climate Services (ARECS)

Join the initiative at: **www.arecs.org**

- ✔ Monthly, seasonal and decadal wind and solar forecasts
- ✔ Provide feedback, register your needs
- ✔ Receive a quarterly, seasonal wind forecast newsletter

Website

ARECS
Advancing Renewable Energy with Climate Services

Beta site

HOME | ABOUT ARECS | PROJECTS | NETWORK | EVENTS | NEWS | JOIN US

Monthly to decadal probabilistic climate forecasts for safe and efficient energy management

- Business Opportunities
- Climate Variability and Risk
- Wind Forecasts
- Solar Forecasts
- Decision Making Process
- Publications
- Newsletter
- Glossary

MINIMISE UNCERTAINTY

Probabilistic climate forecasts predict the future variability and extremes in weather, to minimise uncertainty of renewable power supply and energy demand. Timescales of interest are from one month to decades.

MANAGE RISK

By understanding the expected variation of weather resources and its impact on the energy system, improved, proactive and anticipatory adaptation decisions can be made to better manage energy planning and operation risks.

OPTIMISE STRATEGIES

ARECS aims to stimulate the use of probabilistic climate forecasts to manage the future risk of renewable power supply and energy demand, by developing a full assessment of wind, solar and temperature predictability alongside tools to effectively analyse the forecasts.

How could wind power supply and energy demand vary next season?

It is currently unknown how wind, solar or temperature resources will vary from one season to the next. The ARECS newsletter aims to demonstrate how state-of-the-art climate forecasting could minimise the uncertainty of future resource variability, and guide decisions within the energy sector.

Click here to view probabilistic forecast examples

Could probabilistic forecasts been used to predict meteorological events in the past?

If your strategies were affected by a variability in climate conditions, please send us details of such events, so that we can assess how well our probabilistic forecasts could have predicted them. Information should include the reference month, season or year, the geographical area, and the observed meteorological conditions:

Newsletter

Issue 2: released February 2014

View this email in your browser

Wind Forecast for last spring 2013

ARECS
Advancing Renewable Energy with Climate Services

Seasonal Forecasts for Wind Energy

How will wind power vary next season, and how could this affect your:

- Investment Cash Flow - Energy Trading - Insurance Derivatives -

- Operation & Maintenance Schedule - Energy Balance -

It is currently unknown how wind resources will vary from one season to the next, and the effect this could have on important planning and operational questions like those above.

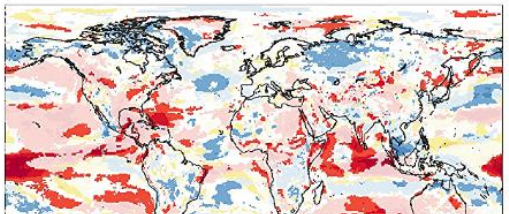
This quarterly newsletter issues seasonal wind forecasts from the same upcoming season, but in the previous year, and compares them to the observations of what actually happened.

The aim is to demonstrate how state-of-the-art climate forecasting could minimise the uncertainty of seasonal wind variability, and guide decisions within the wind energy sector.

To manage climate-related risks for a specific decision making process in the future, wind forecasts could be issued in real time via a climate service, for a given season and at a relevant spatial scales.

Probabilistic Spring 2013 Forecast of the Most Likely Wind Speed Category (above normal, normal or below normal)

This spring season forecast demonstrates wind information that could have been made available on **February 1st 2013 for months March - May (inclusive) 2013.**



Data represented:

Observed 10m Wind Resource Anomalies (m/s): based on reanalysis data (ERA-Interim), not direct observations.

Forecast 10m Wind Resource Anomalies (m/s): based on post processed ECMWF S4 forecast system data.

Coloured areas: forecast = observation.

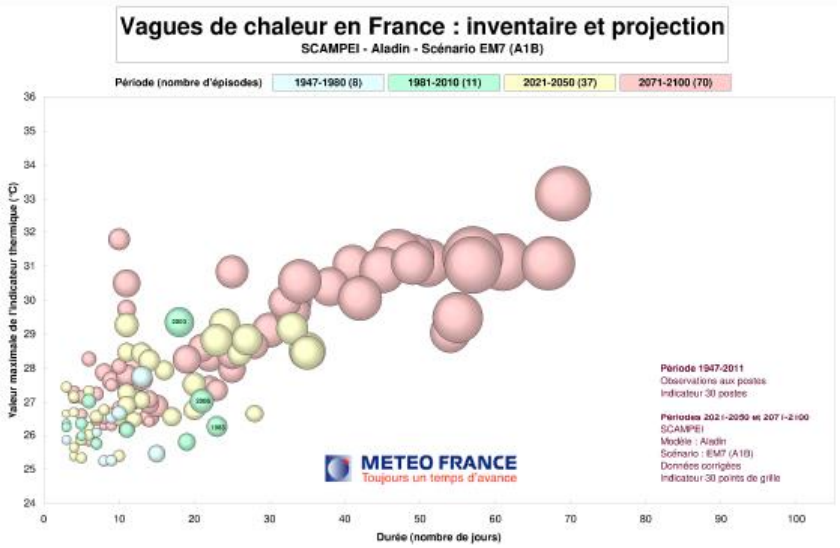
Transparent areas: forecast ≠ observation.

Product examples: (2) Disasters

Users (Insurance, authorities, public & medias)

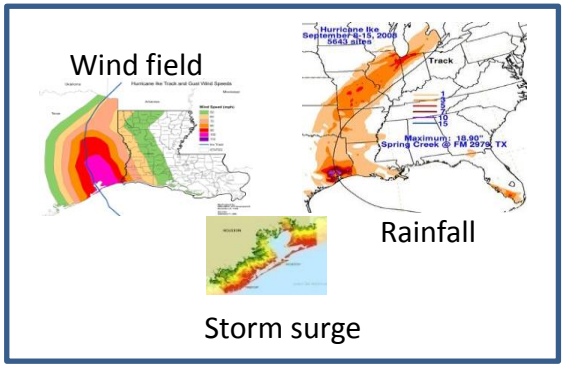
Needs

- Tailored extreme indices (eg floods, heatwaves etc)
- Events catalogs, time series, with multi-variate consistency
- Case study analyses
- Projections of probabilities of events
- Attribution of Extreme events



Heat waves indices (observed and projected)

OASIS

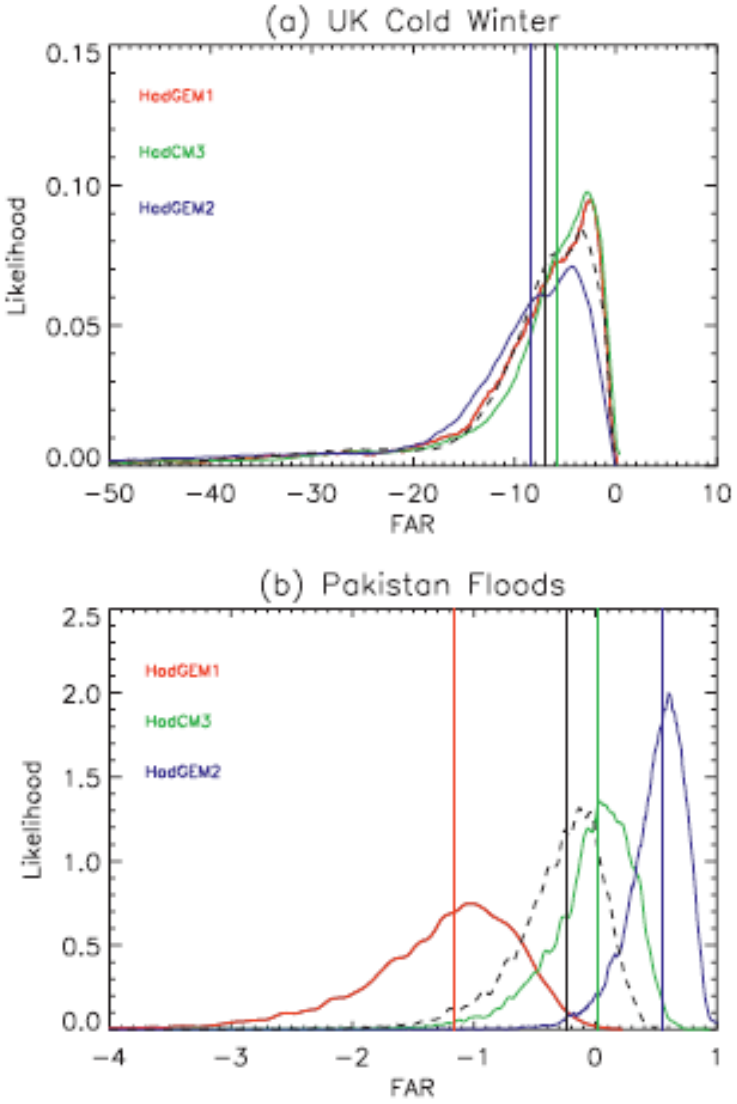


Climate hazard catalogue for modeling exposure

Event attribution products

EUCLEIA

- Fraction of attribution risk (FAR) products
- Could be applied to projection
- Research: FAR for impact indices



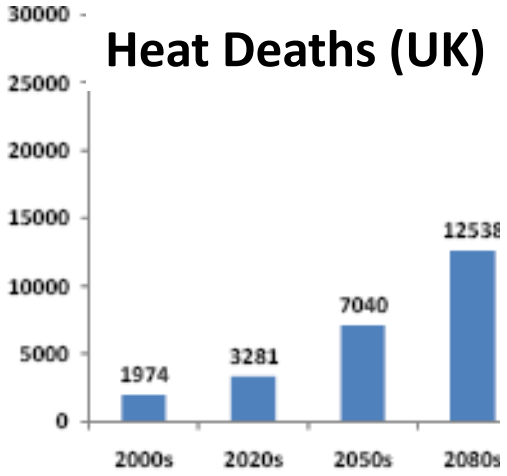
Christidis et al., 2013

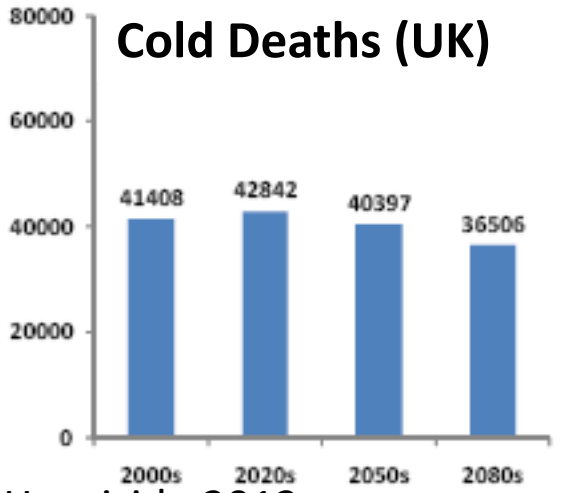
Product examples: (3) Health

Users (public health) familiar with climate indicators

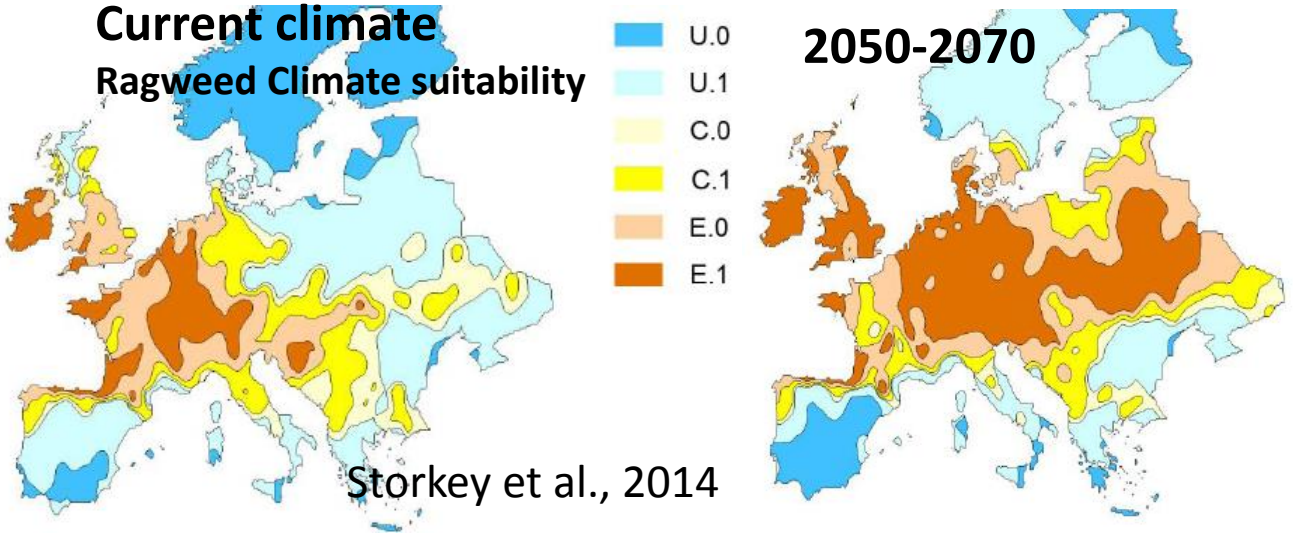
Needs

- Heat/cold effect indicators for mortality
- Air pollution
- Pollen-related risks
- Infectious disease
- Vector-borne disease
- Extreme events
- Animal health





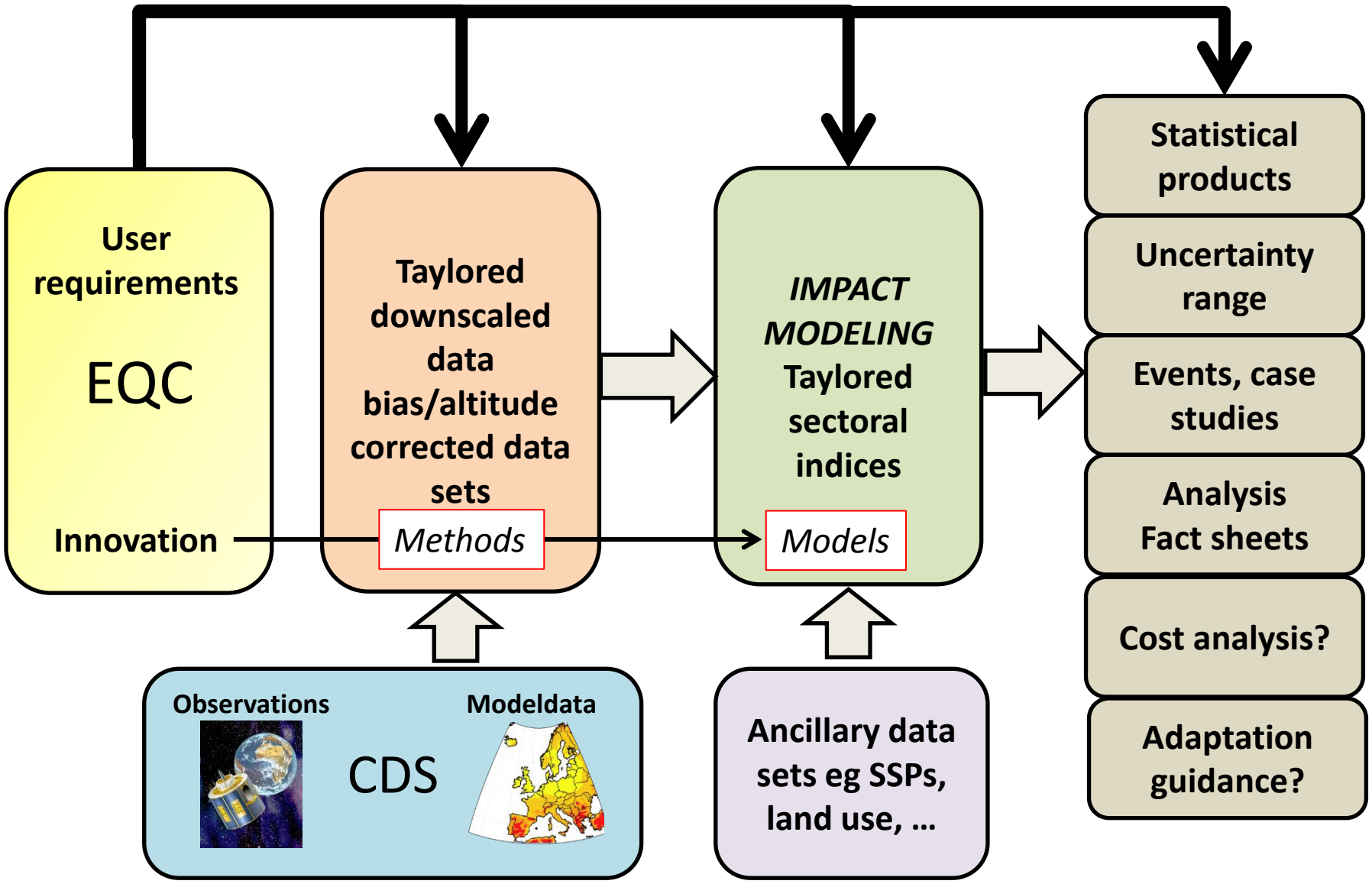
Vardoulakis & Heaviside 2012



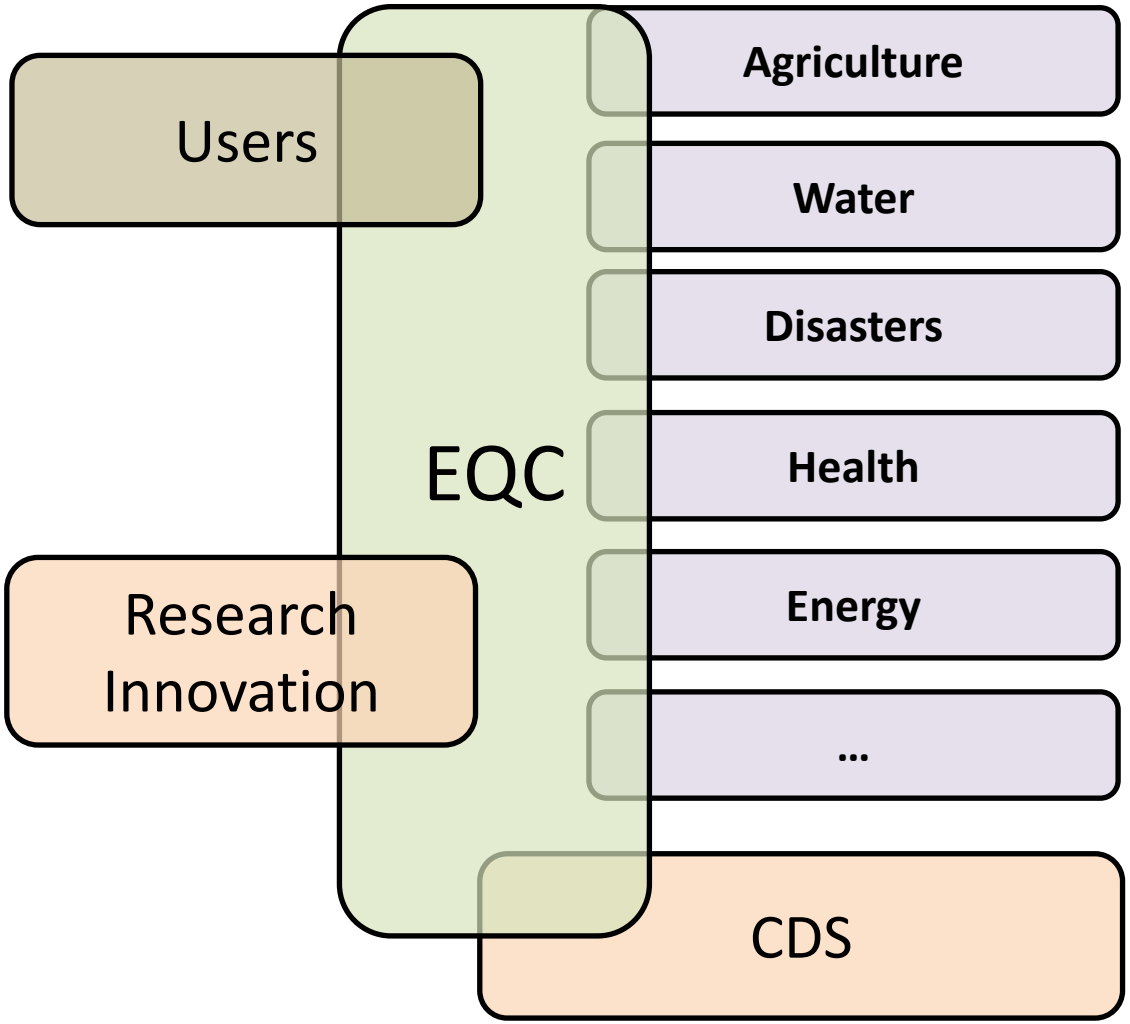
Storkey et al., 2014

ATOPICA
FP7

Workflow (tayloring climate data)



Interdisciplinarity and integration



Co-production of knowledge

- **Across disciplines**
- **Across research/production/users chain**

Interdisciplinarity at all levels necessary (pillars, governance)

Due to frequent back-and-forth exchanges, integration needed across pillars, eg: have sectoral specialists of SIS-prod/research/users in EQC, governance

Open questions to be discussed

- What should be the products of a SIS?
- How specific should be products (how far does it go)?
- What spatial/time scales (Europe? Globe? Both?)
- A constantly evolving science: How to inject innovative methods? What update frequency?
- How to build from other projects and european structures such as Climate KiC, EEA?
- How should it interact with other pillars?
- What steps toward an operational system?
- National vs european systems?