Advancing QUAlity of CLimate services for European Water

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EGU 2020: CL5.7 Climate Services: Guidelines and Suggestions

Best practises and lessons learnt from AQUACLEW

Christiana Photiadou, Lorna Little, Peter Berg, Rafael Pimentel, Maria Jose Polo, Torben Sonnenborg, Ernesto Pasten-Zapata, Vazken Andréassian, Johaness Lückenkötter, Philip Kruse, David Leidinger, Andreas Huber, Stefan Achleitner, Andrea Lira Loarca, and Berit Arheimer

SMHI UNIVERSIDAD D CÓRDOBA GEUS INRAE universität innsbruck technische universität dortmund BOKU

European Research Area for Climate Services

Project AQUACLEW is part of ERA4CS, an ERA-NET initiated by JPI Climate, and funded by FORMAS (SE), DLR (DE), BMWFW (AT), IFD (DK), MINECO (ES), ANR (FR) with co-funding by the European Union (Grant 690462).

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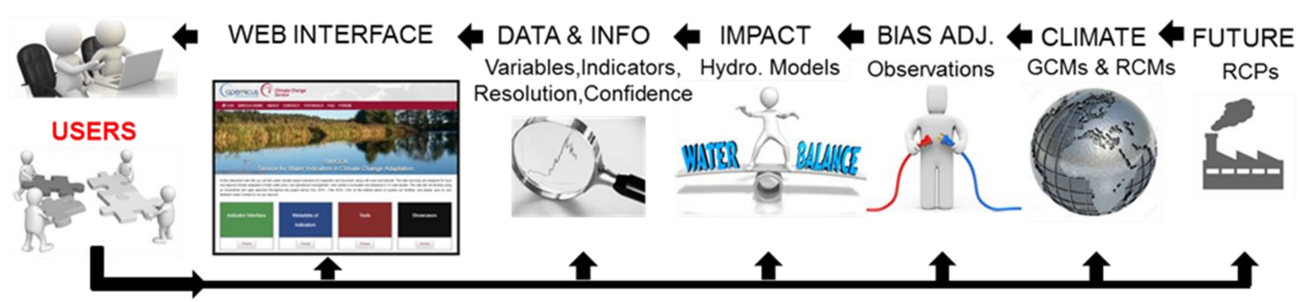
Motivation

- Advance the quality and usability of climate services in water management by:
  - Co-development of climate services (CS) to better incorporate multiple user feedbacks along the entire climate service production chain, from research to production, service use and decision making.
  - How should data, quality-assurance metrics and guidance be tailored along the whole data-production chain to closer meet user requirements, including resolution and precision?
- Facilitate the uptake of data on national & European level. Build upon previous and on-going experience with C3S
- Climate Friendliness: how much climate friendly is our project?



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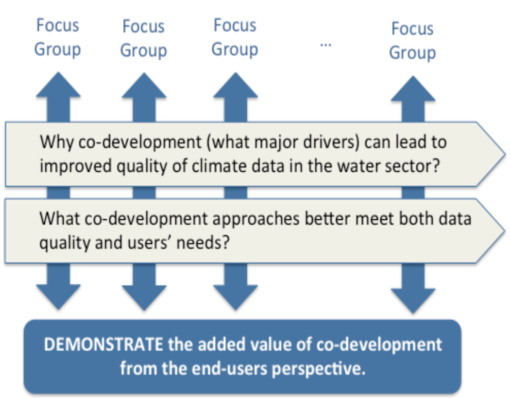
Workflow

User Needs

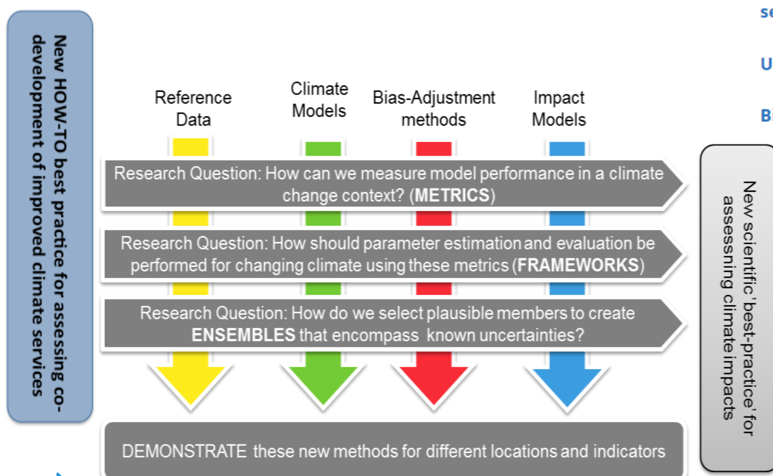
Focus groups
Feedback loops
Prior knowledge
Assessment



Advance Data Quality

Protocols on calibration and validation of hydrological model and bias adjustment methods under a changing climate

Expert Elicitation



User Uptake

Using improved methods to support water management

Pluvial Flash Floods in pre-Alpine Regions (Austria; UIBK/BOKU)

Hydropower production (France; IRSTEA)

Fluvial and coastal interactions under Mediterranean climate conditions (Spain; UGR)

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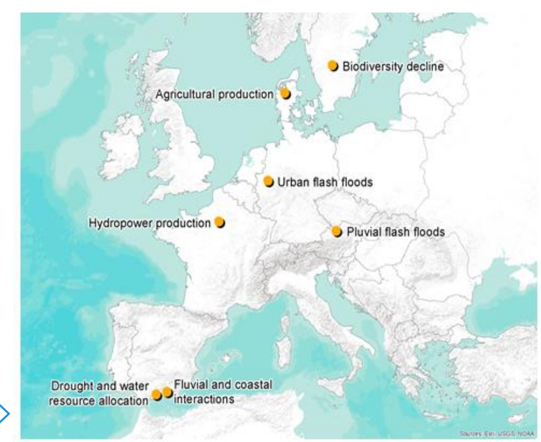
Urban flash floods (Germany; TUDO)

Biodiversity decline (Sweden; SMHI)



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User Needs

Approach

FOCUS GROUP	STUDENT'S EXPERIMENT	FEEDBACK LOOPS
On-line meetings with target groups of users in the water sector, who act as co-developers of climate services with direct interaction with us in the context of their individual sectoral expertise and needs.	Engineering students in bachelor and master programmes act as potential CS users with a similar background knowledge. The experiment assesses the role of previous knowledge in the user's perception of climate services.	On-line guided tour and survey on AQUACLEW website as a tool to train and get feedback to improve our design, development, production and evaluation of climate services.

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User Needs

Outcomes

FOCUS GROUP | STUDENT'S EXPERIMENT | FEEDBACK LOOPS

4 Focus Groups

- Engagement was difficult:
  - South European users were more willing to participate than North European
  - Researchers were more willing to participate than other profiles.
- Preliminary results show:
  - More users were willing to use a CS after the meeting
  - High spatio-temporal data resolution was as a key element.
  - Scientific explanations of climate terminology were not always understood.

Session: HS1.2.3
D9 |EGU2020-13594

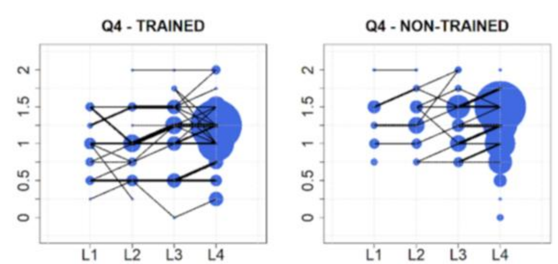
Game

- 115 students participated (Austria and Spain)
- Preliminary results show:
  - The game experience improves knowledge of basic terms.
  - The highest level of information provided the most trust.
  - Users initial knowledge has a role in CS perception.

Session: SSS10.4
D2152 | EGU2020-11442

118 answers collected

- Mostly researchers (48%)
- The top five variables of interest are Precipitation (81%), Temperature (87%), Soil moisture (47%), Water Quality and runoff (39 and 38% respectively).
- 1 km grid and 1000km^2 catchments most commonly used resolution (online)



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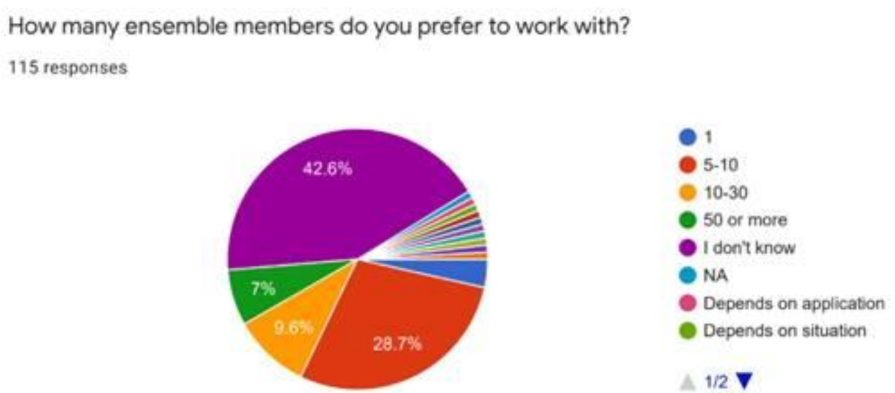
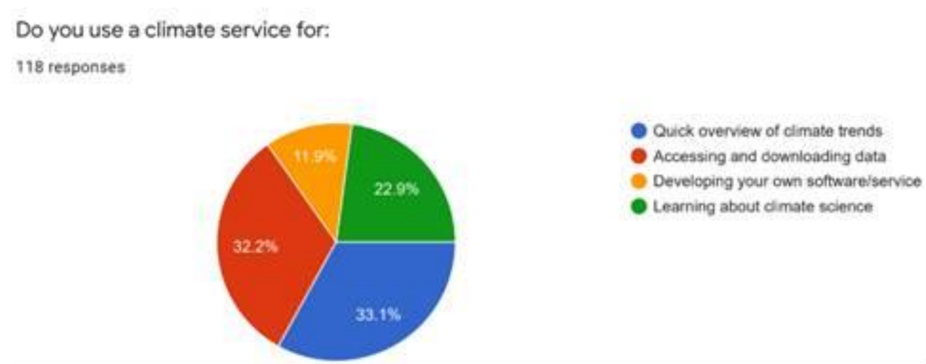
User Needs

Outcomes

- Majority of respondents did not know how many ensemble members they preferred to work with (43%), those that knew preferred 5 – 10 (29%).
- Most respondents prefer all forms of guidance (written, visual, online, in-person) however there was a trend that 2 day online video conferences and online workshops were slightly less preferable
- Most use a climate service for a quick overview of climate trends or to access/download data (33% and 32%). Many use a CS to learn about climate science.
- 34% of respondents did not know what resolution they usually used, otherwise 0.5 degrees was most common (24%)





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Recruitment is needed for climate service users to be knowledgeable and use the services properly

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Advancing data quality

How can we increase the quality and usability of data provided by climate service? We addressed the whole climate impact modelling chain from choice of reference data used to describe today's climate, via climate models, adjustment methods and impact modelling.

Differential Split Sampling Test for Hydrological models

to evaluate the potential of different hydrological models in a future climate over Europe

Session: HS2.4.7
D134 | EGU2020-13228

Differential Split Sampling Test for Bias adjustment methods

to evaluate the potential of different bias corrections methods in a future climate.

Session: CL3.1
D3442 | EGU2020-13211

Expert Elicitation

to assess the probability of model ensemble members to be the most reliable ones for projecting climate change and climate change impacts. Online workshops during May and June

Session: SSS10.4
D2149 | EGU2020-1315

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Advancing data quality

Outcomes

Differential Split Sampling Test for Hydrological models	Differential Split Sampling Test for Bias adjustment methods	Expert Elicitation

Lessons learned:

Improving methodologies on robustness in future hydrological projections is one of the essential aspects in CS in the water sector. Developing the DSS tests for hydrological models and bias correction methods we are able to:

- Assess how the simulation skill for the purpose-specific metrics varies among the models and methods
- Evaluate the simulation skill of the hydrological model under climate change
- Evaluate the influence of adjustment methods

DSS tests can further be used to decrease the influence of unreliable models in the final ensemble.

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User Uptake

Using improved methods to support water management

Approach:

- To understand and evaluate how co-development facilitates and possibly accelerates decision-making and operation of end-user organizations by investigating real-world case studies.

- Each project partner organization is responsible for a Case Study with target Users, in which a water-management issue was defined and tried to be solved by Partner assistance throughout the life project

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User Uptake

Outcomes

Using improved methods to support water management

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Main advantages of new methods:

- Improved understanding of uncertainties in different local regions which led to increased trust/reliance in the climate indicators produced in each case study (Sweden, Spain, France, Denmark)
- Access to new information on vulnerable areas, risks and impacts of climate change that was not previously available (Germany, Spain)

Success factors of new methods:

- Co-development of indicators with clients ensured that results were relevant to client's decision making.
- Inclusion of new pan-European data and information that captures large-scale trends.
- Improved, sometimes simpler methods for downscaling and tailoring data to local regions.

Overall outcomes for client organisations:

- Positive feedback from clients on new indicators and methods provided.
- Results were able to be used in decision-making with some clients gaining increased trust in climate projections, others learning how valuable such information can be.

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Climate Friendliness

Outcome: it is possible to run an international collaborative project in a climate friendly manner, and that engagement in being climate friendly increases when progress is regularly presented (e.g. showing the info at each assembly inspired good discussions, got everyone brainstorming and thinking about it).

The total metric tons of CO_2 have been calculated by using mode of travel (plane, train, etc), place of departure/arrival, and distance travelled, per person travelling. Distance travelled and metric tons of CO_2 were normalised and presented in Figures 2 and 3.

Key messages:

86 % of meetings have been held online compared to 14 % in-person meetings that required travel (Fig. 1)

Online participation by UCO in 2017 led to less metric tons of CO_2 (Fig. 2)

More partners travelled primarily by train in 2018 than in 2017

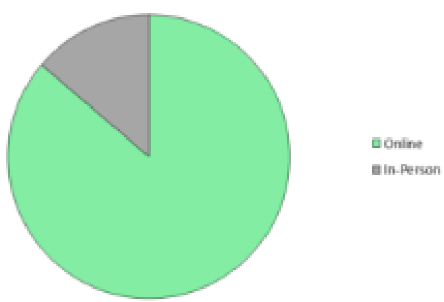

Figure 1. The percentage of online meetings, (in green) compared to the percentage of in-person meetings requiring travel by consortium partners (in grey).

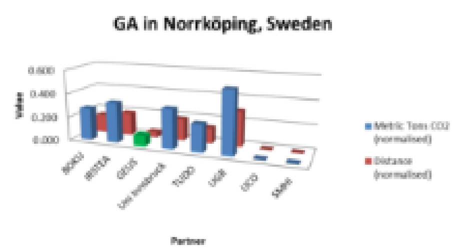

Figure 2. Normalised values for metric tons of CO_2 and distance travelled per partner (can include more than one traveller), for the project's Kick Off meeting in Norrköping, Sweden. Green bars indicate the participants travelled by train. UCO did not travel and participated online.

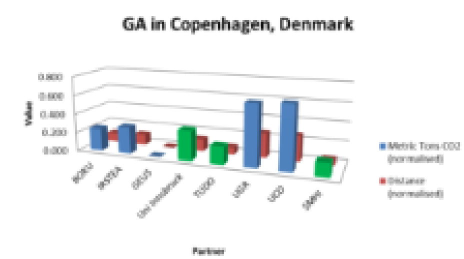

Figure 3. Normalised values for metric tons of CO_2 and distance travelled per partner (can include more than one traveller), for the project's General Assembly meeting in Copenhagen, Denmark. Green bars indicate the participants travelled by train.

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Thank you!

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