Experiences with virtual schools on "Climate data for impact assessments"

Three online courses with interaction between climate and impact researchers

IS-ENES3 virtual Autumn school on Climate data use for impact assessments
4th Nov. – 11th Dec. 2020

IS-ENES3 Virtual Spring & Summer Schools
2021
Climate Data Use for Impact Assessments

Spring: From March 2nd to April 16th
Summer: From May 19th to June 25th

Learning objectives

- Climate data sources, advantages and disadvantages

- Climate models – basic knowledge

- Impact model approaches

- Challenges in climate impact studies

- Challenges in inter/transdisciplinary work

- Climate services and the information needs of users

- Learning to understand each other for future cooperation

Lessons learnt, experiences and recommendations

- Conversion from face to face to virtual schools has disadvantages but also advantages

- Large differences in background knowledge can be compensated

- Interaction between climate scientists and impact researchers is needed

- Impact studies are more than analysing data

- Important to explain the connection between the various subjects in the programme to the participants

- One school is not enough to learn how to use climate data

Experiences with virtual schools on "Climate data for impact assessments"

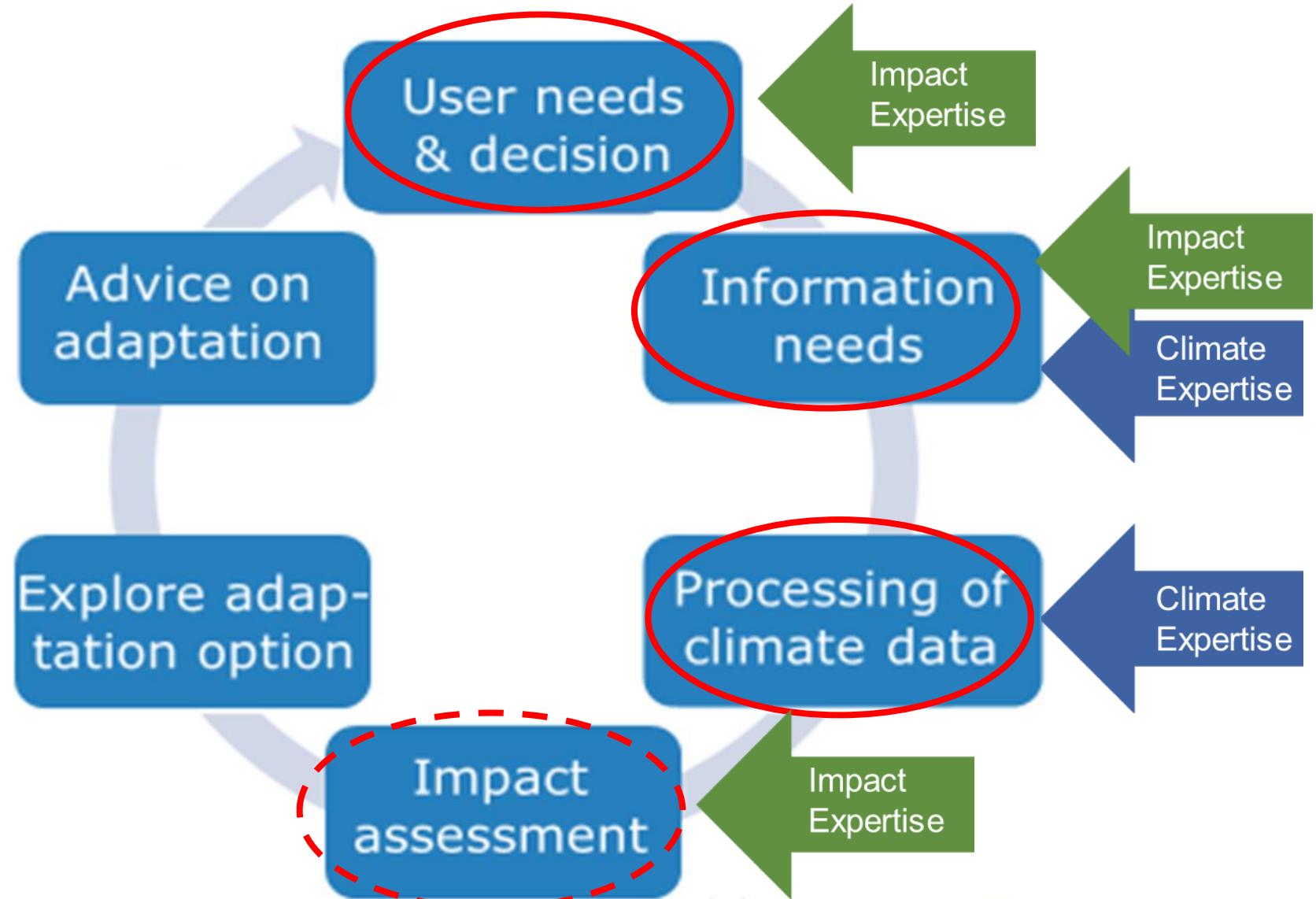## Janette Bessembinder, Judith Klostermann, Rutger Dankers, Vladimir Djurdjevic and Tomáš Halenka

September 9th 2021

Aim of the schools on Climate data for impact assessments

Support exploitation of climate (model) data by Earth system science, climate change impact and climate service communities
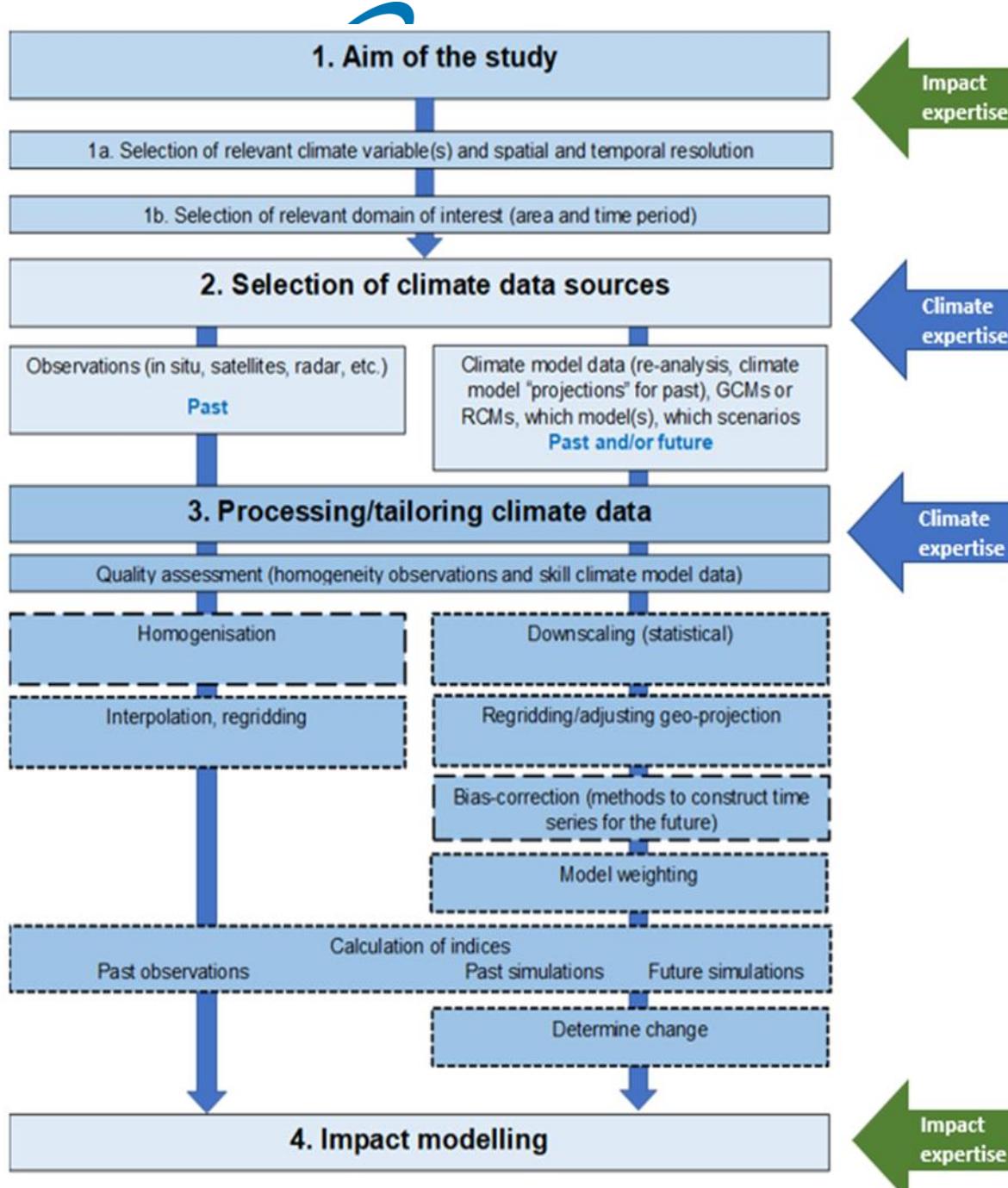
Learning objectives

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Programme overview

- Due to COVID-19 face-to-face schools were converted to virtual
- 3 virtual schools with 20 persons each
- 2 meetings/webinars per week for 6 weeks

Week 1	Week2	Week 3	Week 4-6
Climate models, CMIP, downscaling Climate data sources Climate indices Uncertainties, ensembles ESMValTool	Impact modeling Examples of impact studies in agriculture, forestry, water Climate services Climate data portals	Case study method Climate4Impact portal Bias correction methods	Case studies: 1 climate scientist+1 impact scientist Questions Interactive sessions ongoing work Case study presentations Evaluation

1. Aim of the study

1a. Selection of relevant climate variable(s) and spatial and temporal resolution

1b. Selection of relevant domain of interest (area and time period)

2. Selection of climate data sources

Observations (in situ, satellites, radar, etc.)
Past

Climate model data (re-analysis, climate model "projections" for past), GCMs or RCMs, which model(s), which scenarios
Past and/or future

3. Processing/tailoring climate data

Quality assessment (homogeneity observations and skill climate model data)

Homogenisation

Downscaling (statistical)

Interpolation, regridding

Regridding/adjusting geo-projection

Bias-correction (methods to construct time series for the future)

Model weighting

Calculation of indices
Past observations   Past simulations   Future simulations

Determine change

4. Impact modelling

Impact expertise

Webinar 5, week 3
Steps required for climate impact case studies and challenges in multi/transdisciplinary work

Climate expertise

Lessons ULS on climate data sources

Webinar 1, week 1 Climate models and the international landscape of climate research and modelling and current developments; Climate model evaluation and the ESMValTool)

Webinar 2, week 1: Downscaling techniques and regional modelling, and bias-adjustment; Standards for climate data, CMIP experiments; Climate indices and standards, uncertainties/ensembles, challenges in use of climate data

Webinar 4, week 2: Climate services; landscape of portals, tools with climate data and other data

Webinar 6, week 3: Climate4Impact portal and some examples on possible analyses

Climate expertise

Impact expertise

Lessons ULS on sectoral impacts

Webinar 3, week 2: Approaches used in impact modelling + examples of impact studies

Examples of case studies

✓ Water stress for citrus fruits in Spain
✓ Impact of anomalous temperatures and rainfall on potato yield in Ireland
✓ Impact of temperature change on grapes for Balkan region
✓ Drought impact on maize production in Kenya

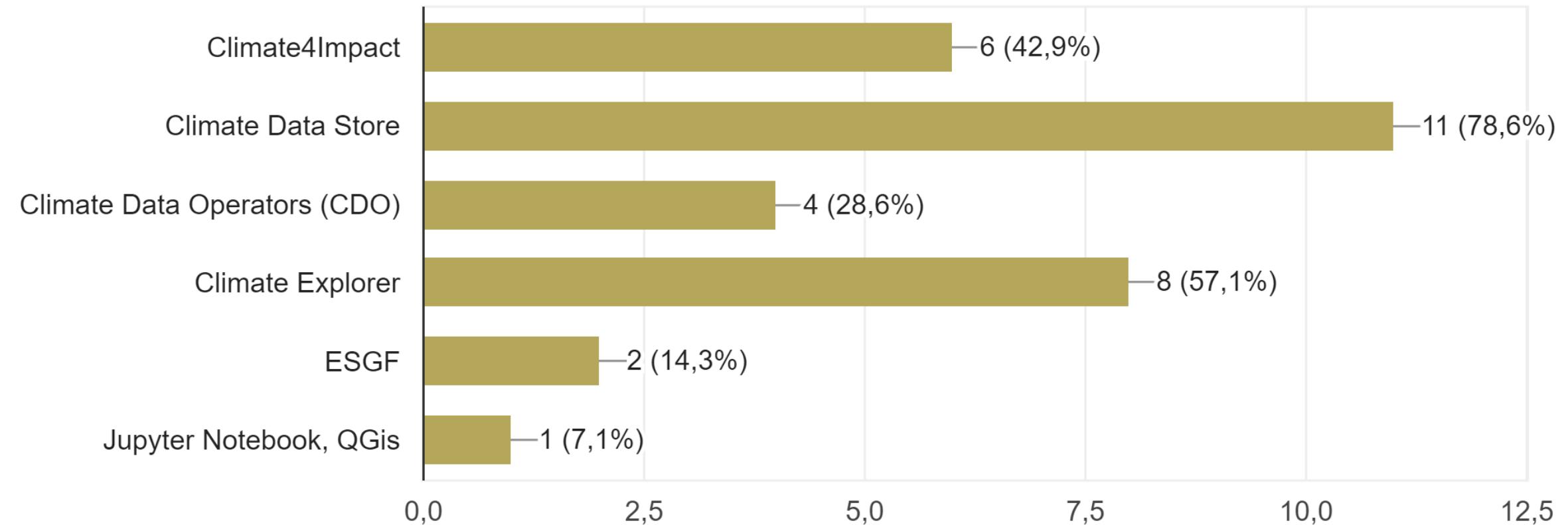✓ Growing season on long term for Beach forests in the Balkan region
✓ Norway spruce and summer drought in Northern Europe
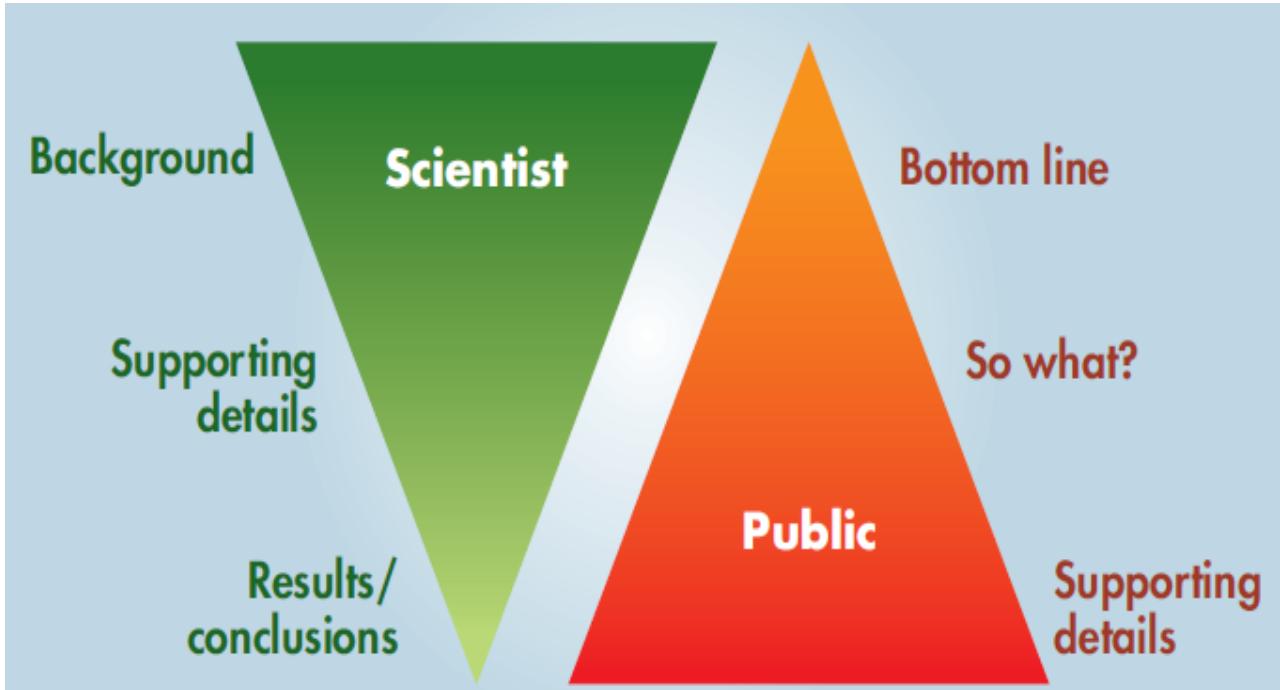
✓ Impact of hot temperature on people in Po plain, Italy

✓ Extreme precipitation and flash floods and impact on Prague and Venice
✓ Flooding of coastal areas in France in the long term
✓ Surface runoff in Norway and impact on hydropower
✓ Sea level and flooding in Bangladesh

Data platforms and tools

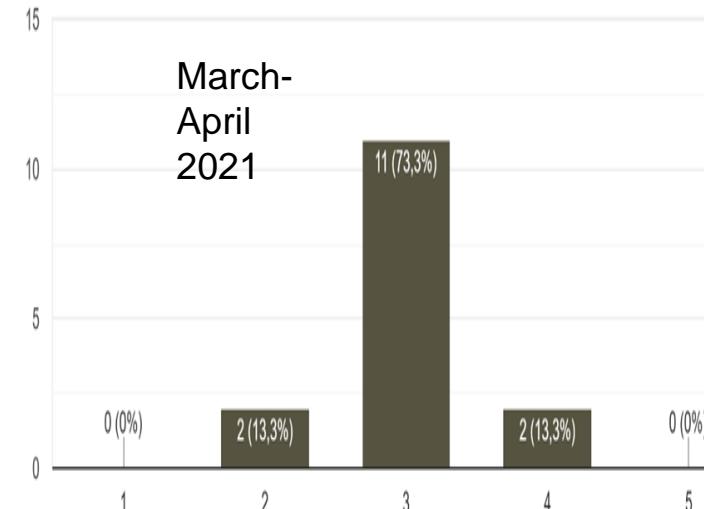13. Which of the the following tools did your group use for your case study?

Tool	Count
Climate4Impact	6 (42,9%)
Climate Data Store	11 (78,6%)
Climate Data Operators (CDO)	4 (28,6%)
Climate Explorer	8 (57,1%)
ESGF	2 (14,3%)
Jupyter Notebook, QGis	1 (7,1%)

Communication and visualisation

Background
Scientist
Supporting details
Results/ conclusions

Bottom line
So what?
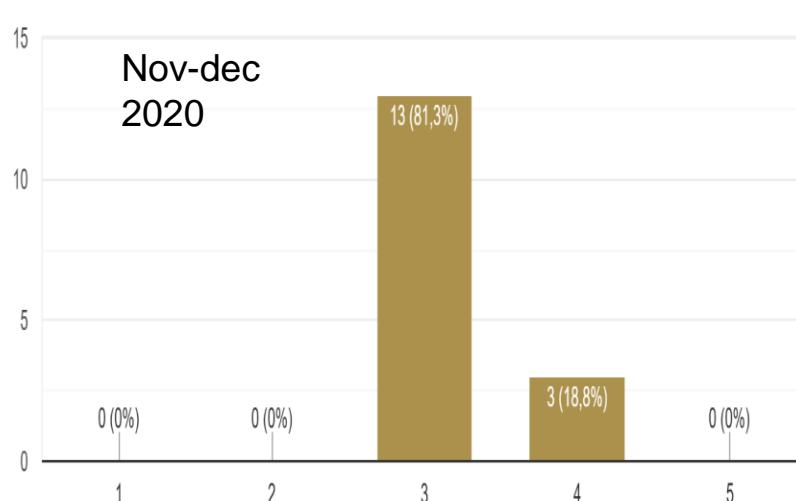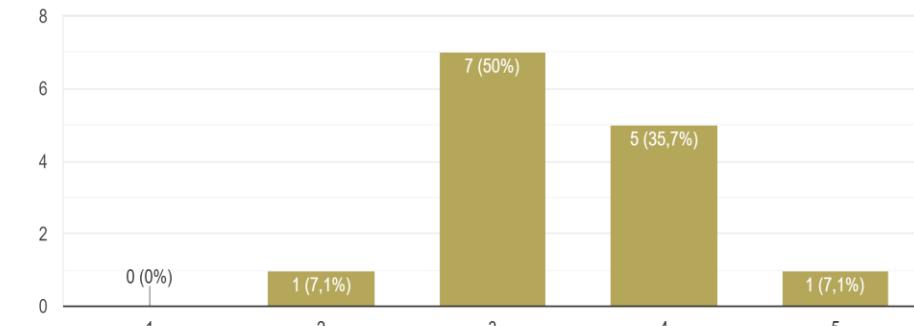**Public**
Supporting details

Sommerville & Hassol, 2011

- Keep your audience in mind, translate the info to their world and the media that they use
- Check your information with your audience
- Don't overload your audience with information and keep the main message in mind
- Present information in several different ways
- Two-way interaction with users

Evaluation

Was the school too easy (1), just about right (3), or too difficult (5) ?

Overall positive evaluation, but also with good suggestions

Challenges and recommendations

Conversion from face-to-face schools to virtual schools has disadvantages but also advantages

- – more limited interaction between participants and with the lecturers, less networking
- – limited number of participants per school
- – potentially more difficult to ask for support for the case studies
- ✓ easy to make recordings, which can be reused
- ✓ easier to combine with other work
- ✓ longer period with more time to work on case studies
- ✓ No CO_2 emissions for traveling

Large differences in background knowledge can be compensated

- • Use of lessons from the C3S User Learning Services
- • Links to additional background material
- • Put climate researcher and impact researcher together for case study

Challenges and recommendations

Interaction between climate scientists and impact researchers is needed

- Use several networks/channels to get sufficient applications from the various disciplines
- Participants experience the real problems that can occur during impact/adaptation studies
- Discuss challenges in case studies with the whole group

Impact studies are more than analysing data

- Also attention for user requirements, communication issues and how results may be used
- Also learn about data needs for user products and reflect on the future of climate science
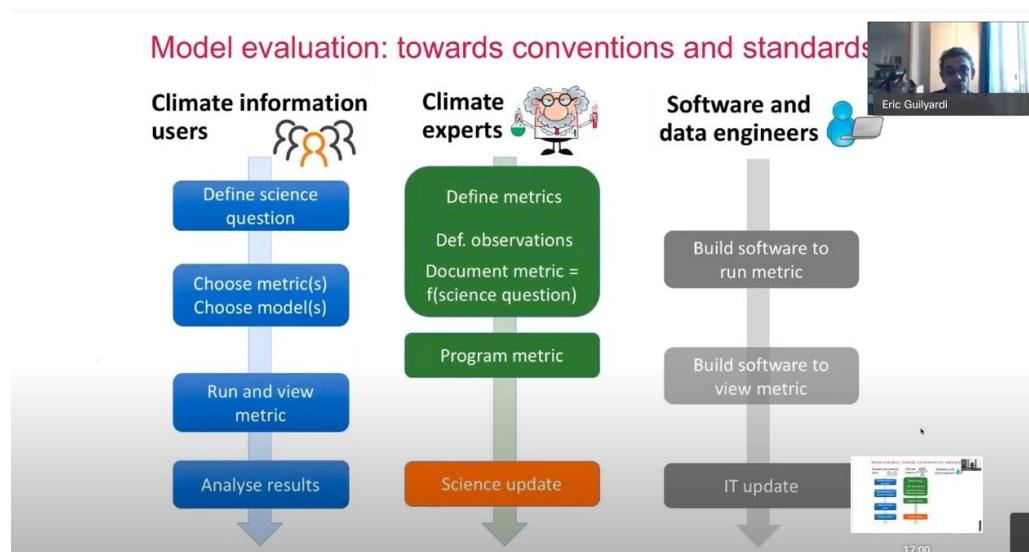
Challenges and recommendations

Important to explain the connection between the various subjects in the programme to the participants

- Additional attention for e.g. the importance of standards and the interconnection of the subjects during the programme
- Explain clearly what is expected from the case study (being not too ambitious, but learn about different steps)

One school is not enough to learn how to use climate data

- Follow-up meeting
- Linked-In group
- Continued support by members of the IS-ENES3 project
- Further short webinars or workshops

Available material

Programme, presentations and videos Autumn School: [First IS-ENES3 virtual Autumn School on Climate data use for impact assessments — IS-ENES 3](#)
(will be replaced by the presentations of the Summer school May-June 2021)

For more material, contact
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- Janette Bessembinder, bessembi@knmi.nl