Towards more effective visualisations in climate services: best practices and recommendations

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The visual communication of climate information is one of the cornerstones of climate services. Characteristics that make a climate service self-explanatory rely on the type of representation used, e.g. interactive or static maps, charts or infographics, and the visual channels applied for the translation of multi-dimensional data, e.g. combination of colour, size, opacity, shapes and other characteristics.

Climate scientists have traditionally used predetermined types of visualisations to represent climate data, including maps (e.g. flood maps, heat maps, choropleth maps), line graphs, and probability distribution functions (PDFs). However, such a tradition neglects a plethora of stakeholders (e.g. businesses, policy makers, citizens) that are increasingly involved in climate adaptation and that are less familiar with the traditional ways of presenting these data.

Effective visualisations should achieve a balance between the amount of represented data, its robustness (i.e. the representation of scientific confidence and consensus) and saliency (i.e. the relevance of the information to user needs). Choices regarding the representation of uncertainty as well as the terminology and language used in visualisations, can significantly impact the way users interpret climate data. This calls for a standardised approach for the visualisation of climate services, which can benefit from best practices applied in other disciplines, such as user experience, visualisation design, graphic design and cognitive psychology.

We describe the main challenges for the visualisation of climate services identified during a visualisation workshop with representatives from 22 climate service projects involved in the Climateurope network, an EU-funded coordination and support action. In break-out group discussions, participants shared their experiences in the development of climate services visualisations and the lessons learned. Findings show that the chosen representation of uncertainty tends to be case specific and that, in general, there is a preference for interactive visualisations where information is gradually disclosed. Inter- and transdisciplinary approaches and aspects related to terminology and language, which are part of the service co-development, require further attention. The analysis of the obtained results provides a picture of the current practice of the climate services visualisation field in Europe and allows to identify recommendations for the development of the next generation of climate services.