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# Visualisation in climate services: status 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 visual modes it employs, e.g. maps, graphs or infographics, and the visual channels applied for the translation of multidimensional data, e.g. combination of colours, shapes or slopes.

Climate scientists have traditionally used predetermined types of visualisations to present climate data, including flood maps, heat maps or choropleth maps. 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. In this sense, there is a need to advance towards climate services visualisations that can guide climate change adaptation decisions by helping users to interpret and use the information as simply and quickly as possible.

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). Therefore, choices regarding the representation of probabilities (e.g. using terciles or information on extreme events), the representation of uncertainty (e.g. showing the ensemble range or filtering by a skill threshold), the type of visual encoding (e.g. selection of the colour palette, use of shapes and sizes) as well as the terminology and language used, are some aspects that can significantly impact the way users interpret climate data.

We describe the main challenges for the visualisation of climate services identified during a visualisation workshop with representatives from 22 climate services 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 effective climate services visualisations and the lessons learned. Findings show that the chosen representation of uncertainty and probabilities tends to be case specific and that there is a preference for interactive visualisations where information is gradually disclosed. Minimising the use of technical concepts in visualisations was highlighted as an objective that requires further attention. The analysis of the obtained results provides a picture of the current status of the climate services visualisation field in Europe and gives recommendations for the development of the next generation of climate services.