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Climate Twins - a tool to explore future climate impacts by assessing real world conditions: Exploration principles, underlying data, similarity conditions and uncertainty ranges

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To achieve public awareness and thorough understanding about expected climate changes and their future implications, ways have to be found to communicate model outputs to the public in a scientifically sound and easily understandable way.

The newly developed Climate Twins tool tries to fulfil these requirements via an intuitively usable web application, which compares spatial patterns of current climate with future climate patterns, derived from regional climate model results.

To get a picture of the implications of future climate in an area of interest, users may click on a certain location within an interactive map with underlying future climate information. A second map depicts the matching Climate Twin areas according to current climate conditions. In this way scientific output can be communicated to the public which allows for experiencing climate change through comparison with well-known real world conditions.

To identify climatic coincidence seems to be a simple exercise, but the accuracy and applicability of the similarity identification depends very much on the selection of climate indicators, similarity conditions and uncertainty ranges. Too many indicators representing various climate characteristics and too narrow uncertainty ranges will judge little or no area as regions with similar climate, while too little indicators and too wide uncertainty ranges will address too large regions as those with similar climate which may not be correct. Similarity cannot be just explored by comparing mean values or by calculating correlation coefficients. As climate change triggers an alteration of various indicators, like maxima, minima, variation magnitude, frequency of extreme events etc., the identification of appropriate similarity conditions is a crucial question to be solved.
For Climate Twins identification, it is necessary to find a right balance of indicators, similarity conditions and uncertainty ranges, unless the results will be too vague conducting a useful Climate Twins regions search.

The Climate Twins tool works actually comparing future climate conditions of a certain source area in the Greater Alpine Region with current climate conditions of entire Europe and the neighbouring southern as well south-eastern areas as target regions. A next version will integrate web crawling features for searching information about climate-related local adaptations observed today in the target region which may turn out as appropriate solution for the source region under future climate conditions.

The contribution will present the current tool functionally and will discuss which indicator sets, similarity conditions and uncertainty ranges work best to deliver scientifically sound climate comparisons and distinct mapping results.