



Regional projection of climate impact indices over the Mediterranean region

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Climate Impact Indices (CIIs) are being increasingly used in different socioeconomic sectors to transfer information about climate change impacts and risks to stakeholders. CIIs are typically based on different weather variables such as temperature, wind speed, precipitation or humidity and comprise, in a single index, the relevant meteorological information for the particular impact sector (in this study wildfires and tourism). This dependence on several climate variables poses important limitations to the application of statistical downscaling techniques, since physical consistency among variables is required in most cases to obtain reliable local projections. The present study assesses the suitability of the “direct” downscaling approach, in which the downscaling method is directly applied to the CII. In particular, for illustrative purposes, we consider two popular indices used in the wildfire and tourism sectors, the Fire Weather Index (FWI) and the Physiological Equivalent Temperature (PET), respectively. As an example, two case studies are analysed over two representative Mediterranean regions of interest for the EU CLIM-RUN project: continental Spain for the FWI and Croatia for the PET.

Results obtained with this “direct” downscaling approach are similar to those found from the application of the statistical downscaling to the individual meteorological drivers prior to the index calculation (“component” downscaling) thus, a wider range of statistical downscaling methods could be used. As an illustration, future changes in both indices are projected by applying two direct statistical downscaling methods, analogs and linear regression, to the ECHAM5 model. Larger differences were found between the two direct statistical downscaling approaches than between the direct and the component approaches with a single downscaling method.

While these examples focus on particular indices and Mediterranean regions of interest for CLIM-RUN stakeholders, the same study could be extended to other indices and regions.