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- applications and services

Identification of trends in European temperature mean, variance and extremes and their use to derive future extreme values

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The 2003 heat wave has shown that unprecedented high temperature levels could be reached. For an electricity producer like EDF, the question is then: in the now asserted climate change context, what can extremely high temperature be? What are the extreme conditions which the currently running installations will have to face and for which future installations have to be designed? A research program is in progress at EDF/R&D to answer these questions. As climate models still have difficulties to correctly reproduce local temperature extremes, the approach consists in carefully studying recent trends in mean as well as in variance and extremes of observed temperature series, obtained from the ECA&D project or the ERA40 reanalysis. It has been found that the trends in mean and variance are generally linked, variance increasing when mean increases in summer and decreasing when mean increases in winter, for a large number of locations in Europe. Besides, a test has been designed to decide if the extremes of the centred and normalised series are stationary, in which case the change in extremes is only due to the changes in mean and variance. This hypothesis can be accepted for a large majority of locations in Europe too, and this provides a way to extrapolate future return levels from the mean and variance changes, observed or given by climate models.