The use of a climate-type classification for assessing climate change effects in Europe from an ensemble of nine regional climate models

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Making use of the Köppen–Trewartha (K–T) climate classification, we have found that a set of nine high-resolution regional climate models (RCM) are fairly capable of reproducing the current climate in Europe. The percentage of grid-point to grid-point coincidences between climate subtypes based on the control simulations and those of the Climate Research Unit (CRU) climatology varied between 73 and 82%. The best agreement with the CRU climatology corresponds to the RCM "ensemble mean". The K–T classification was then used to elucidate scenarios of climate change for 2071–2100 under the SRES A2 emission scenario. The percentage of land grid-points with unchanged K–T subtypes ranged from 41 to 49%, while those with a shift from the current climate subtypes towards warmer or drier ones ranged from 51 to 59%. As a first approximation, one may assume that in regions with a shift of two or more climate subtypes, ecosystems might be at risk. Excluding northern Scandinavia, such regions were projected to cover about 12% of the European land area.