



Future reference evapotranspiration in Duero Valley (Spain)

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The impact of climate change and its relation with evapotranspiration was evaluated in the Duero River Basin (Spain). The study shows the possible future situations 50 years from now from the reference evapotranspiration (ET_o). The maximum temperature (T_{max}), minimum temperature (T_{min}), dew point (T_d), wind speed (U) and net radiation (R_n) trends during the 1980-2009 period were obtained and extrapolated with the FAO-56 Penman-Monteith equation to estimate ET_o. Changes in stomatal resistance in response to increases in CO₂ were also considered. Four scenarios were done, considering the concentration of CO₂ and the period analyzed (annual or monthly). The scenarios studied showed the changes in ET_o as a consequence of the annual and monthly trends in the variables T_{max}, T_{min}, T_d, U and R_n with current and future CO₂ concentrations (372 ppm and 550 ppm). The future ET_o showed increases between 118 mm (11%) and 55 mm (5%) with respect to the current situation of the river basin at 1042 mm. The months most affected by climate change are May, June, July, August and September, which also coincide with the maximum water needs of the basin's crops.