



## **Effect of increasing drought frequency on vegetation cover at the forest/steppe limit**

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In Southeast Europe, warming and drying of summers are stronger than the global trends. In Hungary the significant increase in drought frequency started during the second half of the 20<sup>th</sup> century. Regional impact studies show a direct link between climatic extremes and health status of forests.

In the Carpathian Basin all zonal tree species reach their lower limit of distribution (xeric forest limits). The limits at the planar border zone between closed forest and woodlands (forest steppe) are determined by climatic aridity and are especially vulnerable. Forests at the xeric limit are threatened mainly by recurrent droughts rather than by changes in climatic means.

For the 21<sup>st</sup> century, probability and severity of extreme dry summers has been analysed using the regional climate model REMO. Results of three IPCC scenario simulations (B1, A1B, A2) show a significant drying tendency of summers in the second half of the 21<sup>st</sup> century compared to the period 1951-2000. Probability of summer droughts may increase, consecutive severe dry periods will last longer at the end of the 21<sup>st</sup> century (for the period 2090-2100, 8 extreme dry summers may occur).

These changes may cause growth decline and mortality first of all in beech and spruce forests, being especially sensitive to drought at their xeric limit. The stability loss of closed forest cover leads not only to declining productivity, but also to the decline of the ecological services of forests (soil protection, water supply regulation etc).

Drought stress diminishes carbon fixation, increases soil respiration and may lead to a positive feedback in global warming at the forest/steppe limit in the East-Central- and Southeast-European countries and in Southern Siberia. Therefore the role of these regions is increasing with projected climate changes.

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