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Comparison of methods for assessing drought risk in beech ecosystem in central Slovakia

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Drought, as a consequence of climate change, impacts beech ecosystems on their lower altitudinal limit of occurrence in Slovakia. During the growing season, precipitation deficit and its uneven distribution and rising evapotranspiration demands of ecosystems are significant. In this paper, we evaluate drought risk in the beech ecosystem in Kremnica Mountains (Central Slovakia) firstly from a climatological point of view (Climatic Index of Irrigation, CII) and secondly based on water availability in the soil (Relative Extractable Water, REW), while in the latter case we used drought severity classification for drought episodes. The study aimed to describe drought evolution during vegetation seasons 2017 and 2018 and compare its evaluation methods. Results revealed that CII is sufficient to determinate drought onset in the ecosystem. On the other hand, REW is suitable for accurately describing drought evolution in particular soil horizons and severity of drought determination. Furthermore, since CII is based on climatological data, positive values immediately after precipitation recovery might be inaccurate since soil profile require a certain volume of water over a more extended period for full saturation. Therefore, REW is more precise and suitable for drought evaluation because it considers the amount of water in the soil, closely related to plants' water balance.