



Water stress index for alkaline fen habitat based on UAV and continuous tower measurements of canopy infrared temperature

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This study is focused on developing water stress index for alkaline fen, to evaluate water stress impact on habitat protected within Natura 2000 network: alkaline fens (habitat code:7230).

It is calculated based on continuous measurements of air temperature, relative humidity and canopy temperature from meteorological tower and several UAV flights for canopy temperature registration. Measurements were taken during the growing season in 2016 in the Upper Biebrza Basin in north-east Poland.

Firstly methodology of the crop water stress index (CWSI) determination was used to obtain non-water stress base line based on continuous measurements (NWSBtower). Parameters of NWSBtower were directly used to calculate spatial variability of CWSI for UAV thermal infrared (TIR) images. Then for each UAV flight day at least 3 acquisitions were performed to define NWSBUAV. NWSBUAV was used to calculate canopy water stress for whole image relative to the less stressed areas. The spatial distribution of developed index was verified using remotely sensed indices of vegetation health. Results showed that in analysed area covered by sedge-moss vegetation NWSB cannot be used directly. The proposed modification of CWSI allows identifying water stress in alkaline fen habitats and was called as Sedge-Moss Water Stress Index (SMWSI). The study shows possibility of usage remotely sensed canopy temperature data to detect areas exposed to the water stress on wetlands.

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