



## **The influence of automatic sensors on the homogeneity of long-term sunshine duration series in the Czech Republic**

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For many decades, meteorological stations in the Czech Republic used the Campbell-Stokes (CS) sunshine recorder to measure sunshine duration. However, automatic devices have progressively replaced it since the mid-1990s, first with Vaisala DSU12 sensor and then with the SD4, SD5 and SD6 sensors produced by Meteoservis v.o.s., Vodňany. The technical specifications and modes of function of these instruments differ from those of their predecessors and therefore the integration of their results into standard sunshine duration series may give rise to significant break-points. This contribution uses statistics to analyse differences in sunshine duration totals derived from measurements taken by the CS sunshine recorder and those employing automatic sensors at daily, monthly and annual levels from five meteorological stations of the Czech Hydrometeorological Institute located at Doksany, Churáňov, Kocelovice, Kostelní Myslová (all countryside stations) and Prague-Karlovy (urban station) in the 2003–2018 period. These differences are also evaluated from the point of view of daily cloudiness. Finally, series combining measurements by the CS recorder with those from automatic sensors and series measured by only the CS sunshine recorder are created, homogenised and analysed in terms of long-term fluctuations and annual variations. Homogenised series based on recent automatic measurements leads to generally smaller sunshine duration totals compared with those measured by CS sunshine recorder. However, the general character of long-term fluctuations and annual variations remains more-or-less the same.