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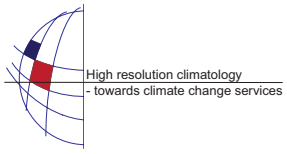

Trends in cooling degree-days for five locations in Croatia

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The cooling degree-days (CDD) and number of cooling days (CD) over the period 1901-2008 are analyzed at five stations that represent different climatic regions in Croatia. The stations under consideration are: Osijek in the southern lowland of Pannonian Plain, Zagreb - Grič at the furthest south-eastern edge of the Julian Alps, Gospić in highland - hinterland of the Dinaric Alps, Crikvenica on the north-eastern Adriatic coast and Hvar on the mid - Adriatic island with the same name. Calculation of CDDs and counting of CDs are performed for the 18˚C, 21˚C and 23˚C temperature thresholds that represent daily mean air temperature. Daily mean temperature (M) is calculated by using daily temperatures measured at 7 a.m. (t7), 2 p.m. (t14) and 9 p.m. (t21), in the following way: M=(t7+t14+2t21)/4. Linear trends over the period 1901-2008 are determined for each month as well as for the whole year (annual trend). Statistical significances of the trends are tested using the non-parametric Mann - Kendal test. For the months with the greatest potential cooling demands - June, July and August, the increasing trend is detected for almost all analyzed values at five locations. Namely, only for the August CD (threshold 18˚C) for Hvar area and for the June and August CDDs (threshold 23˚C) for Gospić area are detected slightly decreasing trends. Most slightly decreasing trends are discovered for September for both parameters at Osijek, Zagreb and Gospić area. Annual trends in both parameters for all locations are increasing, except the annual Gospić CDD (threshold 23˚C) trend that is slightly decreasing. According to the Mann - Kendal test neither of the annual trends in CDD and CD for three temperature thresholds are statistically significant at 0.05 significance level in Gospić and Osijek. On the contrary, all of the mentioned annual trends are significant in Zagreb and Crikvenica, and almost all in Hvar (except trends in CD for the 21˚C and 23˚C thresholds). Months with the significant trends in most of analyzed values are: May and June in Osijek, May, June and July in Zagreb, June in Gospić, June, July and August in Crikvenica and July in Hvar.