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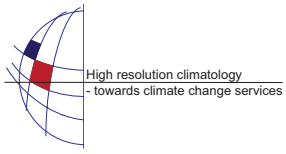

Comparison of the impacts of hot and cold spells on mortality in individual seasons and population groups

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Extreme temperature events influence human society in many ways, including impacts on morbidity and mortality. While the effects of hot summer periods are relatively direct in mid-latitudinal regions, much less is known and little consensus has been achieved about possible consequences of positive and negative temperature extremes in the other parts of year. The study examines links between hot and cold temperature anomalies and daily all-cause mortality in the population of the Czech Republic in individual seasons (DJF, MAM, JJA, SON) over 1986-2006. Hot (cold) spells are defined as periods of at least 2 days with anomalies of average daily temperature from the mean annual cycle above (below) the 95% (5%) quantile of their empirical distribution in a given part of year. Excess daily mortality is calculated as deviations of the observed number of deaths and the expected number of deaths, the latter taking into account effects of the long-term changes in mortality and the annual cycle. Periods when mortality is affected by influenza and acute respiratory infection outbreaks are identified and excluded from the datasets before the analysis. We focus on differences in the mortality impacts between individual seasons and population groups (males/females; the elderly/younger population).
The analysis reveals that
- the largest effects of either hot or cold spells are observed for hot spells in JJA;
- much smaller but still significant effects are associated with hot spells in MAM;
- the impacts of hot spells are more direct than those of cold spells, with shorter lags;
- females are much more vulnerable to high temperatures than males;
- cold spells are associated with excess mortality in DJF and to lesser extent in SON and MAM;
- the lag with the largest impacts of cold spells in DJF is longer in the elderly (70+ yrs; around 10 days) than younger population (0-69 yrs; 4 days), which likely points to different prevailing physiological effects;
- disproportionately large effects in the elderly are observed for hot spells in JJA but to a much lesser degree for cold spells in DJF;
- a long-term trend toward decreased impacts on mortality in hot spells appears in JJA as well as in transition seasons.