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Heat wave's short term effects in vulnerable groups: Parkinson disease and pregnants

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People over 65 years and those with certain underlying health conditions are considered particularly susceptible to extreme temperatures, but heat has a particularly important effect in patients with Parkinson's disease (PD) and pregnant women, causing premature births (PTB). We analyzed and quantified the short-term effect of high temperatures during heat waves in Madrid on daily mortality and PD-related hospital admissions and PTB during 2001-2009. We used an ecological time-series design and fitted Poisson regression models. We analyzed the daily number of deaths due to PD and the number of daily PD-related emergency hospital admissions and PTB in Madrid, using maximum daily temperature (ºC) and chemical air pollution as covariates. We controlled for trend, seasonalities, and autoregressive nature. There was a maximum daily temperature of 30 °C at which PD-related admissions were at a minimum. Similarly, a temperature of 34°C coincides with an increase in the number of admissions. For PD-related admissions, the Relative Risk (RR) for every increase of 1°C above the threshold temperature was 1.13 IC95% (1.03-1.23) at lags 1 and 5; and for daily PD-related mortality, the RR was 1.14 IC95% (1.0-1.28) at lag 3. Furthermore, we observed evidence of a short term effect at Lag 1, RR: 1.055 IC95% (1.018 1.092) on preterm births during the studied period. Our results indicate that suffering from PD is a risk factor that contributes to the excess morbi-mortality associated with high temperatures, so heat waves are associated with PTB and is relevant from the standpoint of public health prevention plans.

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Drivers of carbon sequestration in grassland soils: Evidence from long-term experiments

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Human activities over the last century have greatly contributed to affect the structure and functioning of many terrestrial ecosystems worldwide. From a climate change perspective human-managed ecosystems often act as a net source (rather than a sink) of atmospheric CO_2. Thus, we need to improve ecosystems' ability to sequester carbon (C) and reduce the C-footprint of many human-production systems including agriculture. Across terrestrial ecosystems soils represent the largest stores of C and have the potential to accumulate more C under suitable management practices. Grassland soils across Europe remain important food production systems whose long-term sustainability is threatened by increasing management intensification. Here, I present results from multiple long-term grassland experiments which show how soil C sequestration can increase with greater plant species diversity and/or under common agricultural practices. These findings suggest that there are different significant drivers of soil C sequestration and that their relative contribution varies along a gradient a grassland management intensity. For example, greater biodiversity facilitate soil C sequestration in semi-natural (e.g. low nutrient input) grasslands whereas the addition of organic nutrients to soils or agricultural liming contribute to higher soil C sequestration in intensively-used grasslands. I finally discuss why it is important to measure soil C sequestration rates across several years and what biogeochemical mechanisms might be responsible for changes in soil C sequestration through time.

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