



Trends of fog, mist and haze during the last 30 years: the role of air quality and atmospheric circulation

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Since the 1970s, European temperatures have risen by $\sim 0.5^{\circ}\text{C}$ per decade, a much faster than that of global mean temperatures ($\sim 0.18^{\circ}\text{C}/\text{decade}$) and mean temperatures over land ($\sim 0.27^{\circ}\text{C}/\text{decade}$). Surface solar radiation increase since the 1980s is thought to have contributed to this additional warming, but its link with temperature trends has not been quantified so far. We show that significant changes in fog, mist and haze frequencies may have largely contributed to this recent climate evolution in Europe, explaining on average 20% of recent daytime warming, and to more than 50% in parts of Eastern Europe in fall-winter. This decline is evidenced for all seasons and hours from the analysis of a large multi-decade set of surface horizontal visibility data.

We compare this decline with trends obtained for the rest of the globe. We then investigate the connexions of those trends with air quality data, and the synoptic and local atmospheric circulation.