Environmental and geographical effects on fog occurrence

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Fog

• a very complex atmospheric phenomenon

• in some areas it can contribute substantially to hydrological and chemical inputs and is therefore of high environmental relevance

• Its formation is affected by numerous factors, such as meteorology, air pollution, terrain (geomorphology), and land-use
• Aim: to explore how selected environmental and geographical factors influence fog incidence

• In separate studies, we have examined terrain (altitude, slope, land-form), forests and waters
• So far, two studies have been published in STOTEN
• Here, some selected results are presented
Input data:
• daily fog observations at 56 professional meteo stations in Romania, 1981–2017
• GIS-derived information on terrain, forested areas, land-use

Approach:
• semiparametric generalised additive logistic model for the probability of fog occurrence with potentially nonlinear, smooth effects modelled via penalised splines
Stations observing fog, the records of which were used as input data in our analysis.
Some results
Year-to-year fog incidence
Seasonal effect on fog incidence
Effect of altitude on fog incidence
Seasonal effect of forests (without distinguishing of forest type) on fog occurrence
How different types of forests affect fog incidence?
Changing behaviour of fog in different altitudes over the time
Conclusions

• GAM proved to be an excellent tool for exploring different factors influencing the fog occurrence.
• Forests significantly affect fog occurrence, though forests are apparently minor players compared to other dominant factors, such as seasonality and altitude.
• A forested area in a station’s neighbourhood is a factor significantly influencing fog incidence, in our case, forested area in a circle with a 3 km radius from a meteorological station proved to be the most influential in this respect.
• The influence on fog occurrence differs between coniferous and broad-leaved forests, which is manifested in different shapes of curves showing the effect of broad-leaved, coniferous or mixed forests.
• Our data support the assumption that the effect of forest on fog occurrence differs with altitude.
Details published in:

- **Fog in Romania**

- **Fog in Czechia**
    - [https://doi.org/10.1016/j.scitotenv.2018.04.322](https://doi.org/10.1016/j.scitotenv.2018.04.322)