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A satellite perspective on fog and low stratus dissipation over Europe

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In this study, the dissipation of fog and low stratus (FLS) over Europe is analyzed based on geostationary satellite data using logistic regression.

The dissipation of FLS is a result of the interaction of complex physical processes and its timing has implications for environmental systems, traffic at land, sea and in the air, as well as for the production of solar energy. However, the timing of FLS dissipation, as well as its relationship to meteorological and land surface conditions has not been investigated quantitatively over a large spatial and temporal scale yet.

In this study a 10-year FLS dissipation climatology is created using logistic regression. For this, a binary satellite-based FLS mask for each 15-minute interval from 2006-2015 over Europe, by Egli et al. 2017, is used. A logistic regression is applied to identify the dissipation time of each individual fog event from the binary FLS time series. Marked geographic FLS dissipation patterns are apparent, where FLS is found to dissipate earlier in elevated terrains and persist longer in valleys. Furthermore, the influence of different meteorological and land surface conditions on FLS dissipation are investigated.

In the future, the presented approach will be extended to analyze FLS formation and its dependency on meteorological and land surface conditions.