Poster

Abstract Title
Climatic fluctuation and COVID-19 in Berlin, Germany

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Abstract Text
Notwithstanding centuries-long modeling, terms and pace of recurrence, and the spatial distribution of outbreaks and epidemic waves of infectious diseases, remain to be understood to a level of predictability. Here, the impact of organized intraseasonal climate dynamics (notably heat waves vs. cool spells) on the regional course of the pandemic is scrutinized. Societal shutdown creates a 'laboratory' situation suited to disentangle extrinsic from intrinsic factors. In a pilot study of shutdown in Berlin, regional climatic data are blended in daily resolution with the COVID-19 incidences. We do not impose seasonal harmonics to a model but use advanced methods of data and systems analysis to follow the epidemic evolution in relation to its climatic background via a set of surface variables (air temperature, pressure, relative humidity, wind speed) and sunshine duration.

Early in March 2020, under relatively cool conditions and a calm wind field, a pressure wave passed the region, followed by marked increase in daily sunshine and an accompanying drop in relative humidity. This favorable extrinsic change may have triggered the epidemic outbreak. In the weeks until rise of shutdown restrictions, organized slow dynamics in the regional climate system are exploited to quantify regressions aimed to drive an epidemic (SEIR) model by the slow intraseasonal manifold of observed climate. The model develops two dynamic regimes: epidemic waves which asymptotically disappear (reproduction number R=0) and endemic solutions which run into R=1 via damped oscillations. Beyond the remarkable situation at outbreak, intrinsic epidemic waves bear the potential of (at least episodic) synchronization.

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No conflict of interest

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