Araujo & Naimi 2020 Discussion

sgroves@umces.edu Switch account

Resubmit to save

* Required

Email *

sgroves@umces.edu

Do you feel this study is an appropriate application of species distribution modeling? Why or why not? Please support your answer with examples.

This paper was not an appropriate application of species distribution modelling. The authors begin with the inherent assumption that the coronavirus' habitat is defined by an external environment, however, this assumption ignores that much of the viral lifecycle is spent within the host and its bodily environmental conditions. For the brief periods that the virus is outside the body, it is unclear whether climate or human behavior govern the spread. For instance, is it more important that the virus maintain a specific temperature outside of the body or is it more important that its host behave in such a manner that gets it closer to other potential hosts. Using an SDM, there is a correlation of higher coronavirus with colder temperatures, but there is also a simultaneous and uncaptured correlation of humans gathering inside when it is cold outside. Another issue with the SDM involves sampling bias. Much of the warmer climate areas contain high uncertainties and low uncertainties, representing over half of the globe (Africa, Latin America, Southeast Asia). The current approach ignores not only this issue, but also the origin and path of spread across the globe, a lack of constrained area for data and prediction, and temporal patterns (such as the sinusoidal rise and fall of cases due to transmission dynamics, seasonality, and time since introduction). Finally, an analysis of the virus' biology is necessary to understand whether covariates make sense as predictors.

Thinking about the underlying assumptions of using SDMs, are there any that this study ignored?

This study ignores several key assumptions of SDMs: 1) The virus is not in psuedo-equilibrium with the external environment, but rather, it is primarily in equilibrium with the internal environment. Viral particles that settle on surfaces or stay suspended in air are much less likely to survive than those with a host. VIral survival depends on proximity to the next host's environment. 2) Species-environment relationships are not stable through time. The rapid spread of covid defies this assumption. If covid were constrained by an environment, we would see consistent boundary conditions. 3) Species occurrence records did not correctly capture habitat requirements because the data is from initial global transmission of the virus. 4-6) Pretty much all statistical assumptions are defied. The methods are inadequate, predictors are full of error, and data are highly spatially autocorrelated because the virus must move from adjacent location to adjacent location of course. 8) It is unclear whether the species is in psuedo-equilibrium with the environment-- it likely is with the body's environment.

If you were asked to review this paper for a journal, do you feel the methods section of the paper provided enough information to fully evaluate the study? If not, what specific detail(s) were missing?

At a minimum, the authors must discuss how they mitigated spatial autocorrelation, the assumptions behind the three-way-ANOVA approach and its applicability to the parameters, the handling of lag distance for seasonal variability, mitigation of sampling bias by region, and rationale for choosing the specified 10 model techniques and 20 replicates.

A copy of your responses will be emailed to the address you provided.

Submit

Never submit passwords through Google Forms.