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Suitability Map of COVID-19 Virus Spread

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ABSTRACT

This image reports a Maximum Entropy model that estimates *suitable* locations for COVID-19 spread, i.e. places that could favour the spread of the virus just in terms of environmental parameters.

The model was trained just on locations in *Italy* that have reported a rate of new infections higher than the geometric mean of all Italian infection rates. The following environmental parameters were used, which are correlated to those used by other studies:

- Average Annual Surface Air Temperature in 2018 (NASA)
- Average Annual Precipitation in 2018 (NASA)
- CO2 emission (natural+artificial) averaged between January 1979 and December 2013 (Copernicus Atmosphere Monitoring Service)
- Elevation (NOAA ETOPO2)

A higher resolution map, the model file (in ASC format) and all parameters are available at the external link (Zenodo).

The model indicates highest correlation to infection rate for CO2 around $0.03 \text{ gCm}^{-2}\text{day}^{-1}$, for Temperature around 11.8°C , and for Precipitation around $0.3 \text{ kg m}^{-2} \text{ s}^{-1}$, whereas Elevation is poorly correlated.

One interesting result is that the model indicates, among others, the Hubei region in China as a high-probability location, and Iran (around Teheran) as a suited location for virus' spread, but the model was not trained on these regions, i.e. it did not know about the actual spread in these regions.

EXTERNAL LINK

<https://zenodo.org/record/3719184>



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