

# GEO VIRTUAL SYMPOSIUM 2020

Earth Observations for COVID-19 Response and Recovery

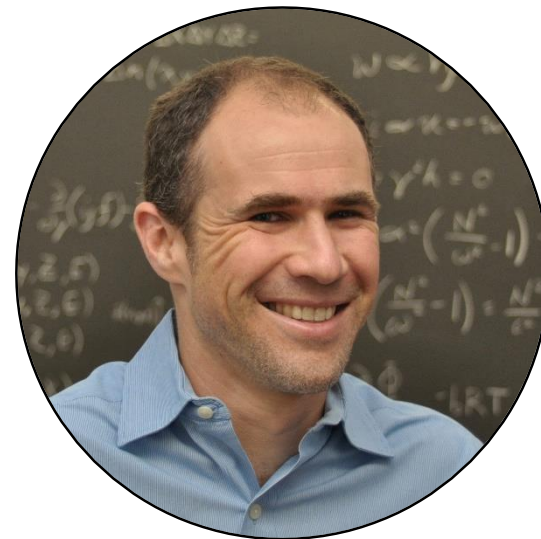
## **Hydrometeorological sensitivities of COVID-19: challenges and opportunities for Earth Observation**

15 June, 2020

## BIO Presenter

Benjamin Zaitchik is an Earth scientist who studies hydroclimatic variability across a range of spatial and temporal scales. This includes work on fundamental atmospheric and hydrological processes as well as application to problems of water resources, agriculture, and human health. Relevant to today's presentation, Dr. Zaitchik leads multiple projects that apply Earth Observation to study and predict infectious diseases, including work on malaria, cholera, enteric pathogens, and, most recently, COVID-19.

Prior to joining Johns Hopkins University, Dr. Zaitchik was a Research Associate at NASA and a Fellow at the U.S. Department of State. He holds a PhD in Geology & Geophysics from Yale University, an MS in Soil Sciences from Cornell University, and an AB in Biology from Harvard College. He is currently the President-Elect of the GeoHealth Section of the American Geophysical Union.



**Benjamin Zaitchik**  
Associate Professor  
Johns Hopkins University

World Map

U.S. Map

Critical Trends

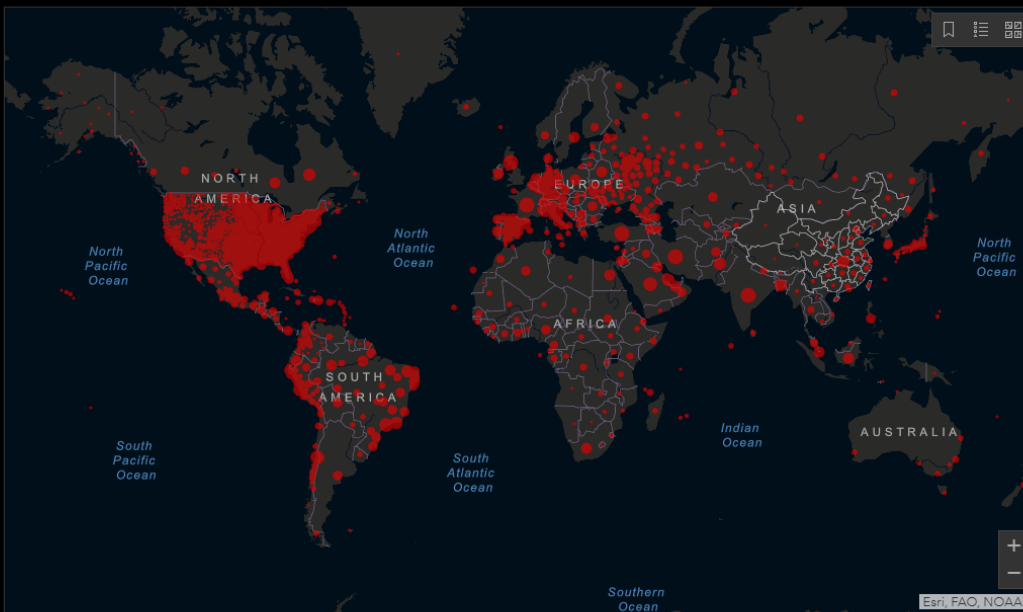
COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)

Total Confirmed

6,601,349

Confirmed Cases by Country/Region/Sovereignty

- 1,872,557 US
- 584,016 Brazil
- 440,538 Russia
- 283,079 United Kingdom
- 240,660 Spain
- 234,013 Italy
- 226,713 India
- 189,569 France
- 184,472 Germany
- 183,198 Peru
- 167,410 Turkey
- 164,270 Iran
- 118,292 Chile
- 105,680 Mexico
- 95,248 Canada



Cumulative Confirmed Cases Active Cases Incidence Rate Case-Fatality Ratio Testing Rate Hospitalization Rate

188

countries/regions

Lancet Inf Dis Article: [Here](#). Mobile Version: [Here](#). Lead by [JHU CSSE](#). Technical Support: [Esri Living Atlas team](#) and [JHU APL](#). Financial Support: [JHU](#) and [NSF](#). Click [here](#) to donate to the CSSE dashboard team, and other JHU COVID-19 Research Efforts. [FAQ](#). Read more in this [blog](#). [Contact US](#).

Global Deaths

391,136

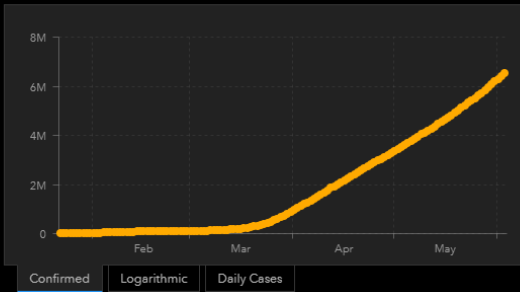
- 108,208 deaths US
- 39,987 deaths United Kingdom
- 33,689 deaths Italy
- 32,548 deaths Brazil
- 29,068 deaths France
- 27,133 deaths Spain
- 12,545 deaths Mexico

Global Deaths Global Recovered

US State Level Deaths, Recovered

- 30,174 deaths, 66,756 recovered New York US
- 11,970 deaths, 27,231 recovered New Jersey US
- 7,201 deaths, recovered Massachusetts US
- 5,832 deaths, 51,019 recovered Pennsylvania US
- 5,736 deaths, recovered Illinois US
- 5,595 deaths, 38,099 recovered Michigan US
- 4,444 deaths, recovered California US

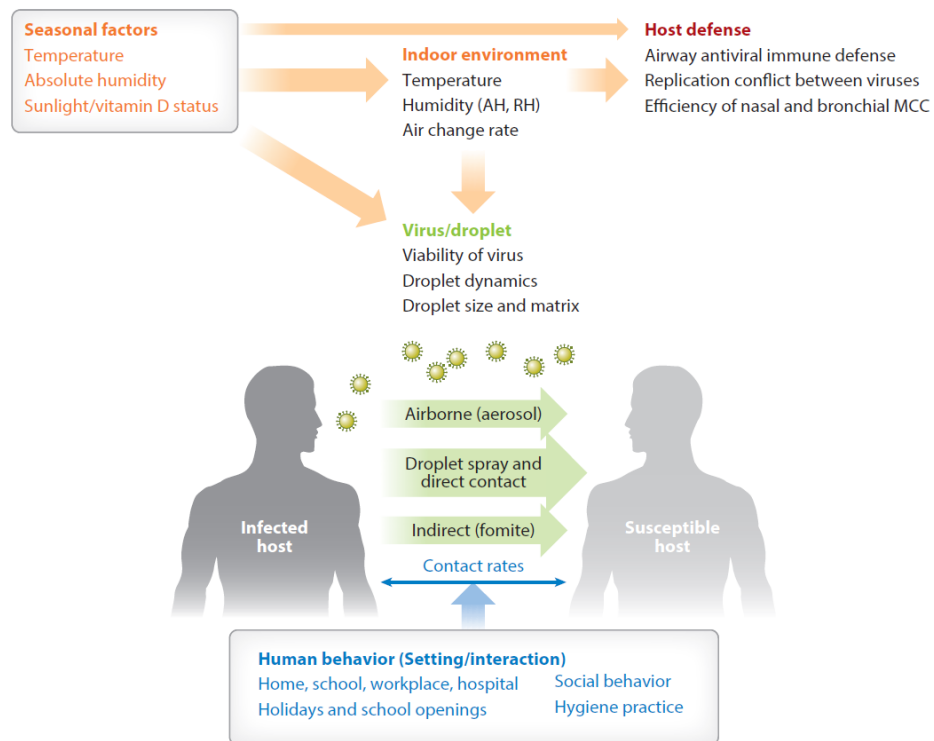
US Deaths, Recovered



Confirmed Logarithmic Daily Cases

# Why might hydrometeorology matter?

Most, though not all, **human respiratory pathogens exhibit seasonality in temperate regions, with a winter peak.**



# Which hydromet variables matter?

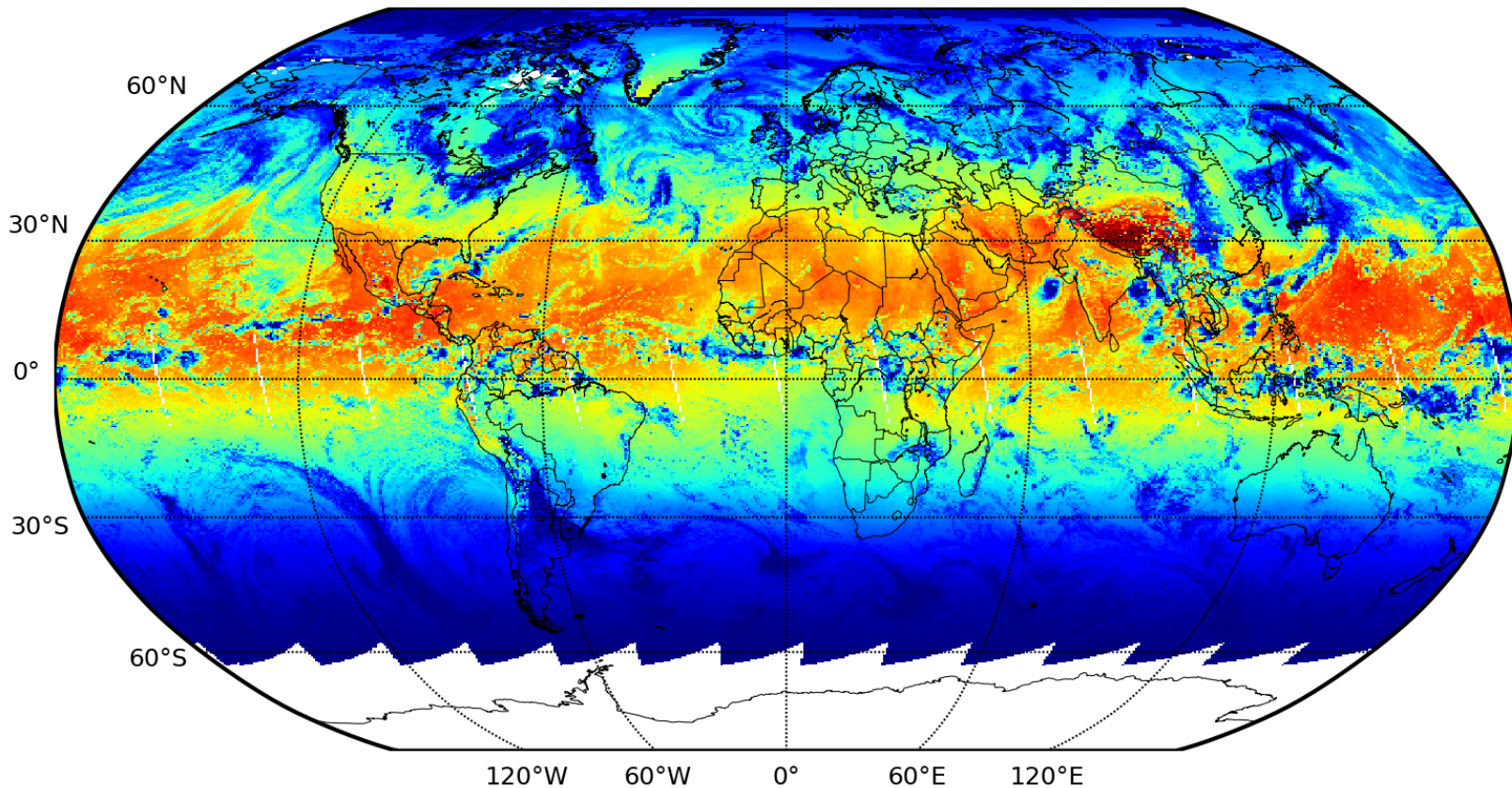
For COVID-19: **we don't know for sure**

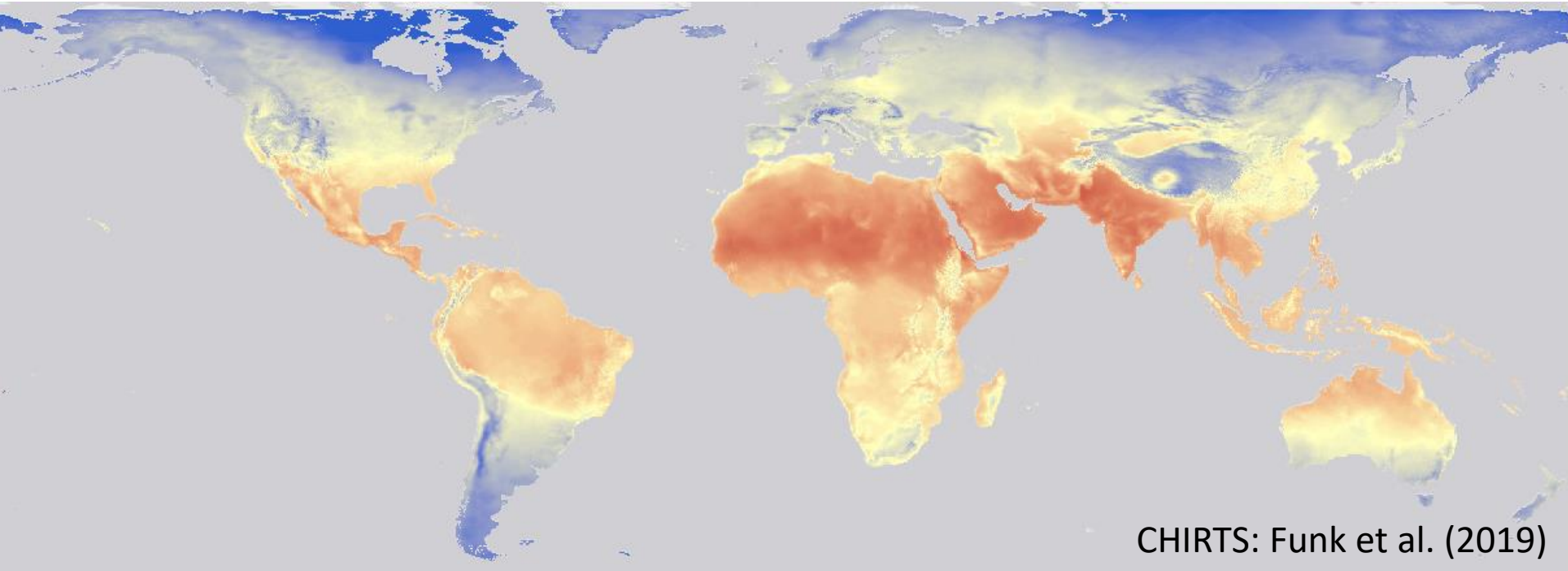
But for influenza and some other viruses:

- Temperature
- Absolute and relative humidity
- UV radiation

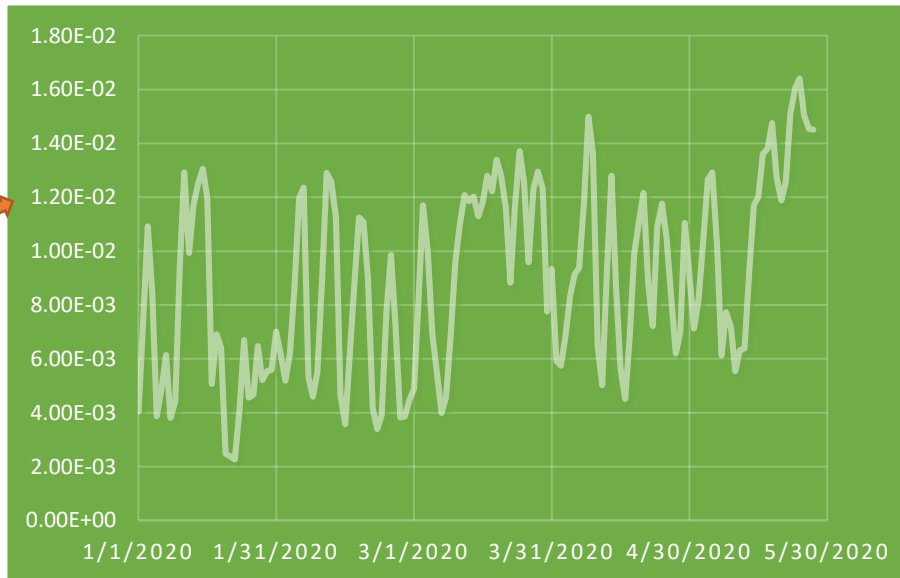
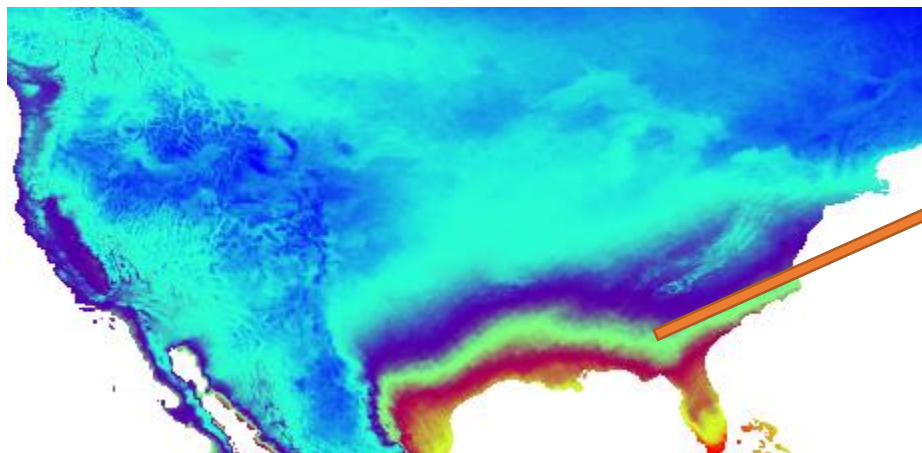


# 2019-06-15: Solar noon UV index, S5P/TROPOMI

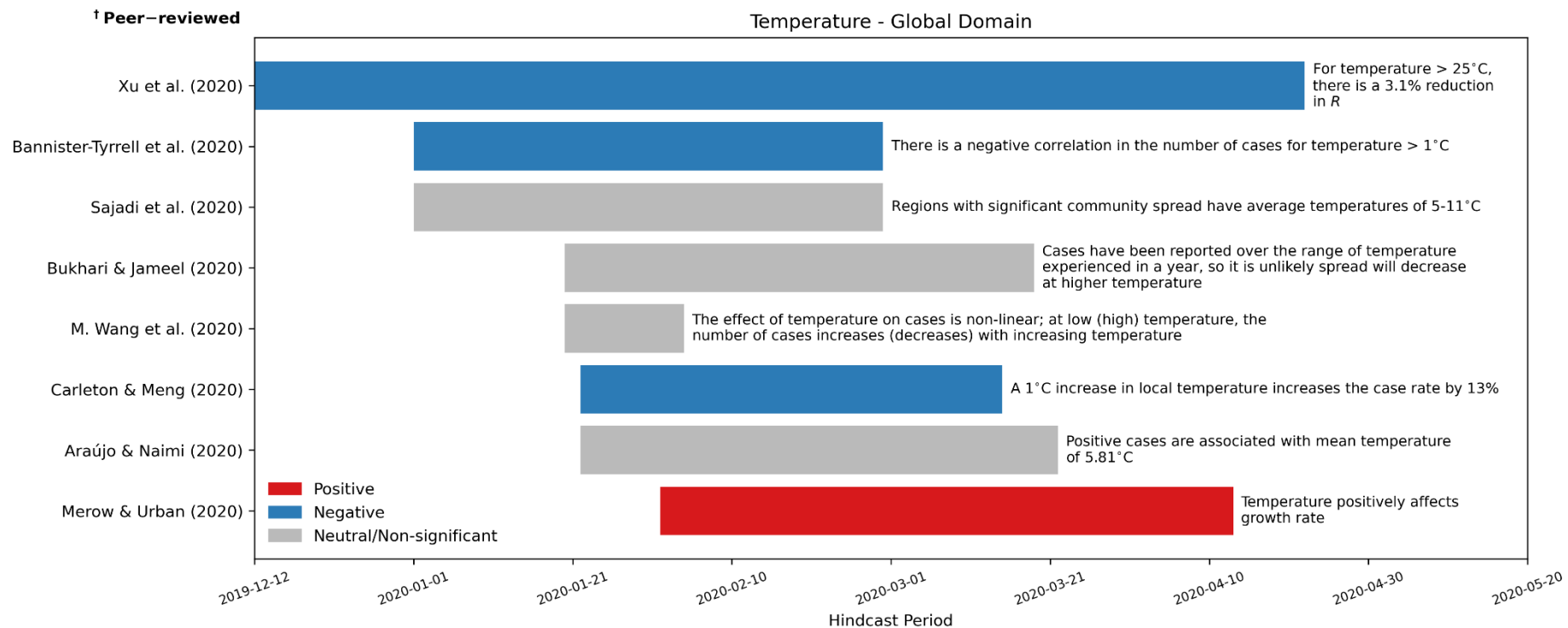


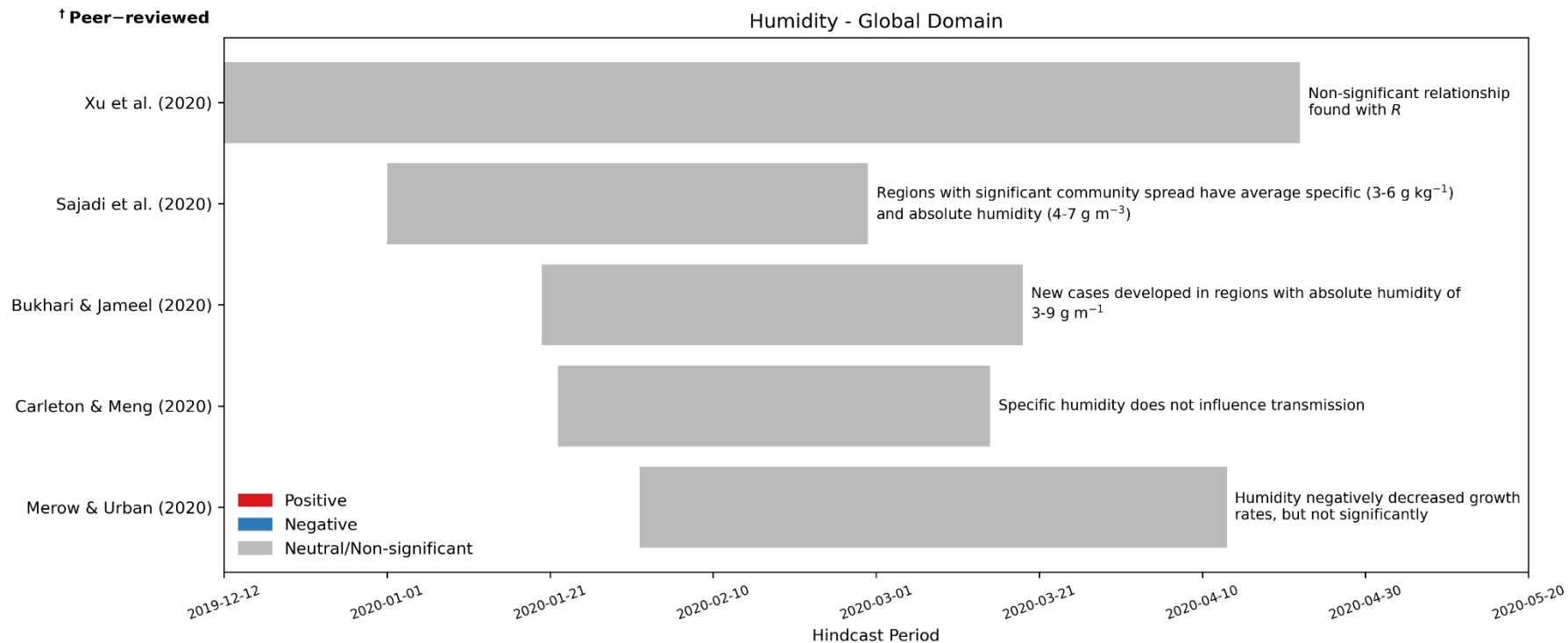


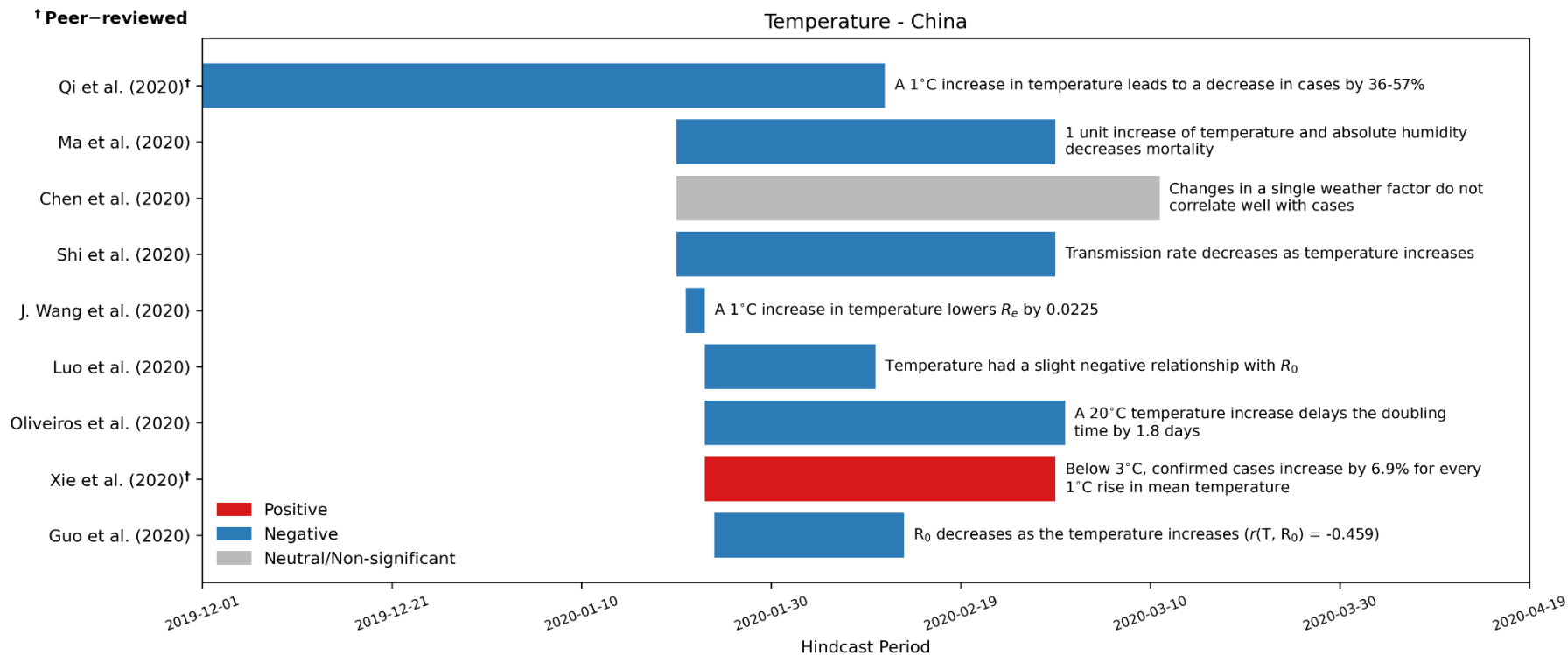
## NLDAS: Surface specific humidity





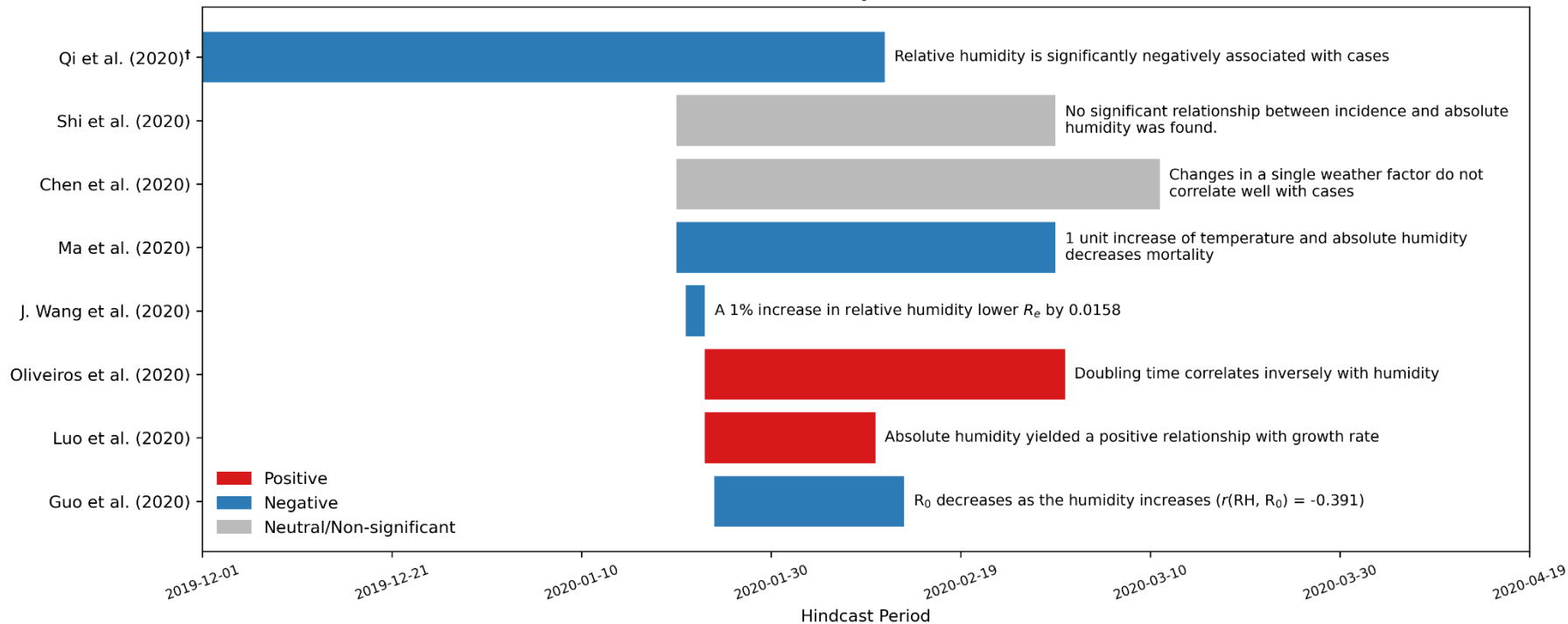






† Peer-reviewed

## Humidity - China

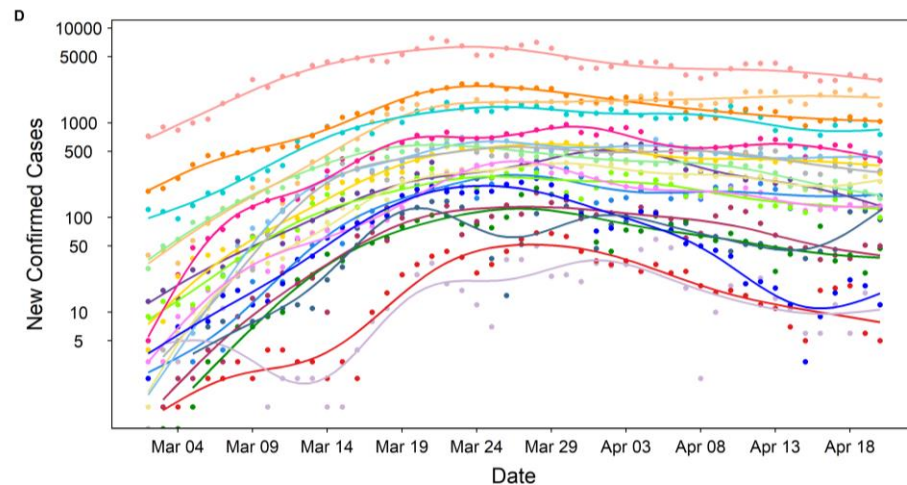
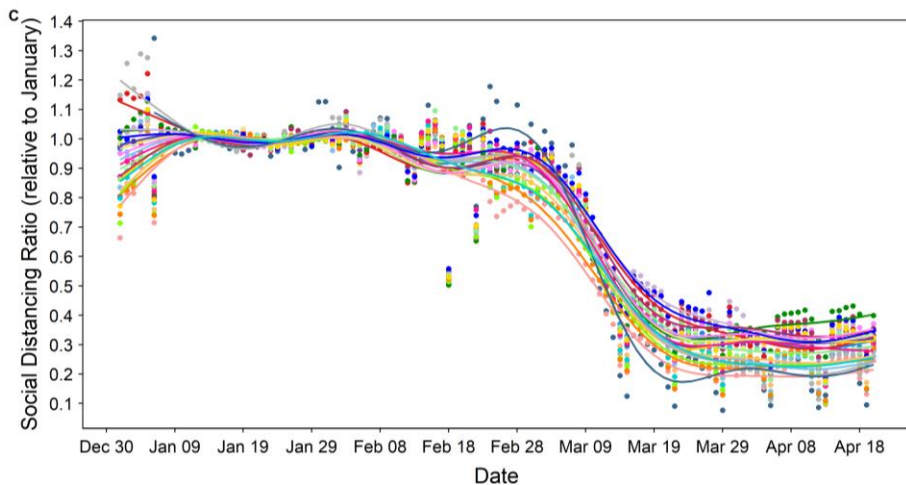


# What's going on?

As of Jan. 20: **4**



# What's going on?



Abruzzo (0.70)	Emilia-Romagna (0.85)	Lombardia (0.79)	Provincia Autonoma di Bolzano/Bozen (0.71)	Toscana (0.86)
Basilicata (0.45)	Friuli-Venezia Giulia (0.61)	Marche (0.85)	Puglia (0.89)	Umbria (0.61)
Calabria (0.49)	Lazio (0.76)	Molise (0.32)	Sardegna (0.71)	Valle d'Aosta/Vallée d'Aoste (0.51)
Campania (0.72)	Liguria (0.79)	Piemonte (0.74)	Sicilia (0.79)	Veneto (0.62)

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U.S. Map

Critical Trends

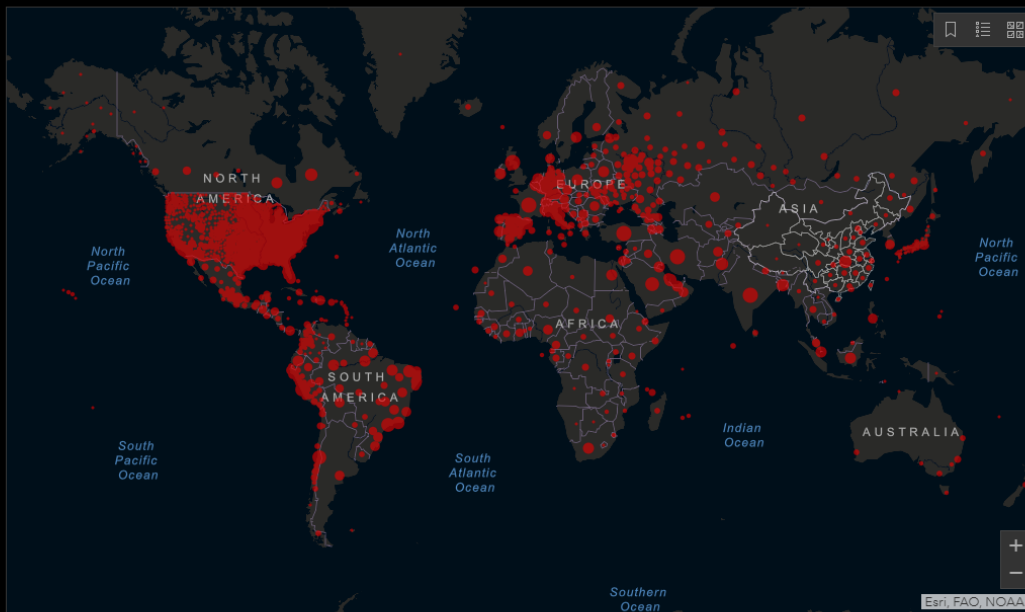
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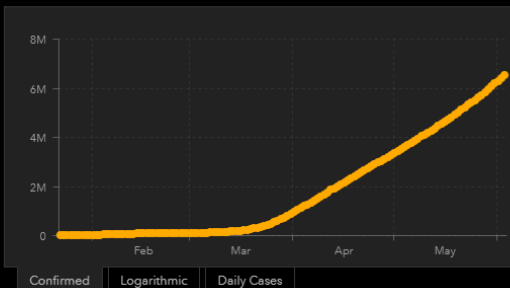
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# What can the EO community do?

- Make our data accessible, usable and **understood**
- **Collaborate** with disease transmission experts and holders of non-EO data
- Communicate and **think creatively**



# Thank You!

Ben Zaitchik / 15 June 2020  
@BenZaitchik / Zaitchik@jhu.edu

**#EO4Impact**

Collaborate and communicate with GEO:

