**Table S1.** Publications that have aimed to establish links between SARS-CoV-2 infections and environmental variables, notably temperature and humidity.

*NPI: non-pharmaceutical interventions. † Studies based on parameter estimates related to some aspect of the initial portion of exponential curves (or other parametric models) that model daily new infections as a function of time. § Study applies* R0*, SEIR model estimates (see next Section 5.3). ‡ Studies offering moderate to strong support for the hypothesis that environmental variables modulate the rate of transmission of COVID-19 (see Section 5.5 in main paper).*

|  | **Countries** | **Time span** | **Lags** | **Independent variable(s)** | **Dependent variable(s)** | **Statistical approach** | **Additional influences** | **NPI** | **Reference** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Iran | 19 February to 22 March 2020 | None | Infection days to end of the study period, average temperature, mean precipitation, humidity, wind speed, mean solar radiation | Daily COVID-19 cases | Correlation, sensitivity analysis between variables evaluated based on the Partial correlation coefficient (PCC) and Sobol'-Janson methods, visual mapping | Population density, intra-provincial movement, classification of provinces based on the De Martonne method | No | Ahmadi et al. (2020) |
|  | Tibet, Bolivia, Ecuador | 19March to 7April 2020 | None | Altitude | Daily COVID-19 cases | Visual mapping | None | No | Arias-Reyes et al. (2020) |
|  | Five Brazilian cities | 13 March to 13 April 2020 | None | Mean, maximum and minimum daily temperatures, absolute humidity, rainfall | Daily new and cumulative COVID-19 cases, contamination rate (per 100,000 habitants) | Principal component analyses (PCA), canonical correlation, linear regression | None | No | Auler et al. (2020) |
|  | Global | Not specified |  | Assumes same humidity sensitivity as influenza, HCoV-OC43 and HCoV-HKU1 | *R0* from the SARS-CoV-2 pandemic (using USA case data) | SIRS model simulations, parameterized with SARS-CoV-2 *R0* vs humidity effects from other respiratory viral diseases | None | No | Baker et al. (2020) |
|  | New York City, USA | 1 March to 12 April 2020 | Lags of 3 and 4 days | Mean, maximum, minimum temperature, rainfall, humidity, wind speed, air quality | Daily new and total COVID-19 cases | Kendall and Spearman correlation | None | No | Bashir et al. (2020) |
|  | Provinces of Spain | 25 February to 28 March 2020 | 5 days | Mean, maximum minimum temperature | Daily cumulative COVID-19 cases | Mixed models (3rd order polynomial) | Population density, age, number of travellers, number of companies | No | Briz-Redón and Serrano-Aroca (2020) |
|  | 72 Global locations | To end of March 2020 | None | Temperature, precipitation, and elevation | Average “rates of infected people” (not well defined) | Maximum entropy-based  ecological niche model | CO2 and population density | No | Coro (2020) |
|  | 10 Chinese Provinces, Australia, Belgium, Egypt, Finland, Iran, Italy, Philippines, South Korea | 31 December 2019 to 29 February 2020 | None | Maximum, minimum temperature | Unspecified, but probably number of cases | Student’s t-test or Mann-Whitney U test of pairs of countries | Ongoing human-to-human transmission | No | Del Rio and Camacho-Ortiz (2020) |
|  | 21 Countries and French administrative regions | 15 February to 3 week in March 2020 | None | Temperature | Daily COVID-19 cases | ARIMA model | None | No | Demongeot et al. (2020) |
|  | Brazil | 15 March to 22 April 2020 | None | Temperature | Daily COVID-19 cases | Spearman correlation, multiple regression | Population density, number people >65 years old, structure of health services | No | Figueiredo et al. (2020) |
|  | Global (85 locations, listed in Gunthe et al., 2020, Table 1) | 2 February to 10 March 2020 | None | Mean, maximum, minimum, relative humidity, UV index, precipitation, cloud cover | Number of cases | Scatterplots, “various statistical fits” | None | No | Gunthe et al. (2020) |
|  | 50 States of the USA | 1 January to 9April 2020 | None | Temperature, relative humidity, absolute humidity derived via Clausius Clapeyron equation | Daily COVID-19 cases | Manual classification akin to a correlation by ranks | None | No | Gupta et al. (2020b) |
|  | India | To 27 April 2020 | None | Temperature, rainfall, actual evapotranspiration, solar radiation, specific humidity, wind speed | Total COVID-19 cases | Pearson correlation, linear regression, log-linear GAM | Altitude, population density | No | Gupta et al. (2020a) |
|  | Wuhan, China | 21 January to 31 March 2020 | None | Temperature | Daily COVID-19 cases | Wavelet Transform Coherence, Partial Wavelet Coherence, Multiple Wavelet Coherence | None | No | Iqbal et al. (2020a) |
|  | Global | To 5 June 2020 | None | Averages of maximum and minimum temperature, daylight hours | Total COVID-19 cases | Linear regression | Population density | No | Iqbal et al. (2020b) |
|  | 31 Iranian provinces | 15 February to the 22 March 2020 | None | Temperature | Daily COVID-19 cases | Receiver operating characteristics (ROC) curves | Population density | No | Jahangiri et al. (2020) |
|  | Global, excl. excluding China, South Korea, Iran and Italy | To 28 March 2020 | None | Temperature, humidity | ‘Ratios of rate ratios’ of  cumulative counts | Weighted random-effects regression (uni- and multivariate) | Latitude, school closures, restrictions of mass gatherings, and measures of social distancing | No | Jüni et al. (2020) |
|  | 30 Chinese cities | 5 January to 22 March 2020 | 3 days | Temperature, diurnal temperature range, relative humidity, absolute humidity via Clausius Clapeyron equation | Daily COVID-19 cases | Polynomial regression, GLMs with random effects (mixed) models | Migration scale index | Yes | Liu et al. (2020) |
|  | Global | 25 March to 19 April 2020 | None | Temperature | COVID-19 case data at 6 day intervals, total cases, active cases | Spearman and Kendall correlations, log-linear regressions | Population density | No | Mandal and Panwar (2020) |
|  | Counties of continental USA | 22 January to 9 April 2020 | None | Mean, maximum, minimum temperature, precipitation | COVID-19 incidence rate  (unspecified) | Various regression models | 35 environmental, socioeconomic, topographic, and demographic variables | Yes | Mollalo et al. (2020) |
|  | Temperate Northern Hemisphere regions | Not specified |  | Climate sensitivities taken from HKU1, NL63, OC43 and 229E | None | Seasonality estimated from other CoV and applied to SEIR mod. of SARS-CoV-2 | Migration rates | No | Neher et al. (2020) |
|  | Brazil | 18 April to 1 May 2020 | None | Temperature, dew point, average humidity, wind speed | Total COVID-19 cases | Spearman correlation | Population density | No | Neto and de Melo (2020) |
|  | Spain, provincial level | 13 March to 11 April 2020 | 3 lags | Temperature, humidity, hours of sunshine | Daily COVID-19 cases | ‘Seemingly Unrelated Regression’ | Population density, GDP per capita, percentage of older adults in population, mass transit systems | No | Paez et al. (2020) |
|  | Five provinces of Italy | 29 February to 29 March 2020 | None | Temperature, relative humidity | Daily COVID-19 cases smoothed by 5 and 8 day moving averages | Pearson correlation | Climatic regions, cases adjusted for number of tests made | No | Passerini et al. (2020) |
|  | Italy | 14 February to 14 March 2020 | None | Temperature, relative humidity, wind speed | Daily COVID-19 cases | Multivariate linear regression | Urban variables such as population density | Yes | Pirouz et al. (2020) |
|  | Chinese provinces, incl. 345 cities; also Iran, Italy, Japan, Singapore, South Korea | 22 January to 26 February 2020 | None | Temperature, absolute humidity | Proxy Rt from daily COVID-19 cases | Loess regression | Mobility | Yes | Poirier et al. (2020) |
|  | 27 Brazilian capital cities | 27 February to 1 April 2020 | None | Temperature | Daily COVID-19 cases | GAM, polynomial regression | Population density and size | No | Prata et al. (2020) |
|  | 30 Chinese provinces | 1 December 2019 to 20 January 2020 | 14 days | Temperature, relative humidity | Daily COVID-19 cases | GAM |  | No | Qi et al. (2020) |
|  | 9 Cities in Turkey | February to 10 April 2020 | None | Temperature, humidity, dew point, wind speed. | Daily COVID-19 cases (not explicitly stated) | Spearman correlation | Population density | No | Şahin (2020) |
|  | All affected countries | January to February 2020 | None | Temperature, humidity | Presence of significant community transmission | Maps of temperature and infected countries | None | No | Sajadi et al. (2020) |
|  | China, Italy, USA | From December 2019 | None | Temperature, relative humidity, wind speed, atmospheric pressure, air pollution | Total COVID-19 cases | Pearson correlation | Median population age, population density | No | Scafetta (2020) |
|  | All affected countries | 1 December 2019 to 30 March 2020 | None | Mean, maximum, minimum temperature, precipitation | Daily COVID-19 cases | Panel regression | Population density, time of exposure | No | Sobral et al. (2020) |
|  | Kuala Lumpur, Malaysia | 11 March to 21 April 2020 | None | Relative humidity, temperature, wind speed, solar radiation; air pollutants data incl. PM10, PM2.5, SO2, NO2, O3, CO | Daily COVID-19 cases | Paired-samples t-test, Wilcoxon test, Spearman correlation, multiple linear regression | None | No | Suhaimi et al. (2020) |
|  | Barcelona region, Spain | 25 February to 5 April 2020 | 6 days | Maximum temperature | Daily COVID-19 cases | GLM (with autocorrelation) | Weekends, the lockdown period | No | Tobias and Molina (2020) |
|  | Jakarta, Indonesia | January to 29 March 2020 | None | Mean, maximum, minimum temperature, humidity, rainfall | Daily COVID-19 cases | Spearman correlation | None | No | Tosepu et al. (2020) |
|  | Japan’s 47 prefectures | 5 January to 16 March 2020 | None | Temperature | Cumulative number of cases per million | GLM | Population density, mobility, age | No | Ujie et al. (2020) |
|  | Lima, Peru | From March to 9 April 2020 | None | CO, NO2, O3, SO2, PM10, PM2.5 | ‘Infections’ (not specified) | ‘Gaussian Process Regression’ and cross-validation using a neural network | None | No | Velásquez and Lara (2020) |
|  | New South Wales, Australia | January to end of March 2020 | Exponential moving averages of 10 to 21 days | Rainfall, temperature, relative humidity | Daily COVID-19 cases | Correlation, multivariate GAM | None | No | Ward et al. (2020) |
|  | 166 Countries | 27 March to 22 April 2020 | 14 days | Temperature, relative humidity, dew point, wind speed | Daily COVID-19 cases | GAM | Age, Global Health Security Index, Human Development Index, population density | No | Wu et al. (2020) |
|  | 33 Chinese locations | 29 January to 15 February 2020 | Lag from 0-7 days | Temperature, relative humidity, atmospheric pressure, wind speed, SO2, NO2, PM10 and PM2.5, carbon monoxide, ozone | Daily COVID-19 cases | GLM | None | No | Xu et al. (2020a) |
| §  ‡ | China | Early January to early March 2020 | None | Temperature, relative humidity, UV radiation averaged for time period | *R0* | Multiple regression | None | No | Yao et al. (2020) |
|  | 122 Cities in mainland China | 23 January to 29 February 2020 | 14 days | Temperature, relative humidity, air pressure, wind speed | Daily COVID-19 cases | GAM | None | Yes | Zhu and Xie (2020) |

**Table S2.** Preprint studies that have aimed to establish links between SARS-CoV-2 infections and environmental variables, notably temperature and humidity.

*NPI: non-pharmaceutical interventions. † Studies based on parameter estimates related to some aspect of the initial portion of exponential curves (or other parametric models) that model daily new infections as a function of time. § Study applies* R0*, SEIR model estimates (see next Section 5.3). ‡ Studies offering moderate to strong support for the hypothesis that environmental variables modulate the rate of transmission of COVID-19 (see Section 5.5 in main paper).*

|  | **Countries** | **Time span** | **Lags** | **Independent variable(s)** | **Dependent variable(s)** | **Statistical approach** | **Additional influences** | **NPI** | **Reference** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Philippines | 16 March to 2May 2020 | None | Maximum temperature | Daily recovery rate | Pearson and Spearman correlation | None | No | Acosta et al. (2020) |
|  | Australia, Brazil, Canada, Germany, Italy, New Zealand, Singapore, South Africa, Sweden, UK | 22 January to 30 April 2020 | Lag of 14 days | Minimum, maximum temperature, humidity, wind speed | Cumulative COVID-19 cases | Spearman correlation | Hospital beds/1000, Hospital occupancy, lockdown stringency index, USD per capita index, population density | Yes | Adeyemi et al. (2020) |
|  | Three cities in each of Spain, Italy, USA | 26 February to 4 March 2020 | None | Temperature, relative humidity, wind velocity | Cumulative COVID-19 cases | Regression | Population density, travel restrictions. | Yes | Adhikari et al. (2020) |
|  | 70 Cities, regions globally | 18 January to 24 April 2020 | None | Average monthly humidity, minimum and maximum temperature | Cumulative COVID-19 cases | GLM | Population density | No | Ahmed et al. (2020) |
|  | 34 countries (see Alipio, 2020, Table 4) | Not specified | None | Latitude, ozone | COVID-19 cases (unspecified) | Kendall correlation, multiple regression | None | No | Alipio (2020) |
|  | All countries with five or more cases | Up to 10 March 2020 | None | Mean, maximum, minimum temperature, precipitation | COVID-19 cases | Machine learning, ecological niche models | None | No | Araújo and Naimi (2020) |
|  | Belgium,. Brazil, Canada, China, France, Germany, India, Iran, Italy, Peru, Russia, Spain, Turkey, UK | February to 13 May 2020 | Modelled lag (not unambiguously specified) | Average temperature, relative humidity | Daily COVID-19 cases | GAM | None | Yes | Awasthi et al. (2020) |
|  | 162 countries and several regions in China | Up to 20 March 2020 | None | Average temperature (4 week period). Solar irradiance (solar elevation angle) | Daily COVID-19 cases, case rate change (during 11 days after reaching 100 cases) | Correlation | None | No | Bäcker (2020) |
|  | Global to date of study | Up to 29 February 2020 | None | Temperature | Cumulative number of COVID-19 | GLM | Age, capacity to detect emerging diseases | No | Bannister-Tyrrell et al. (2020.) |
|  | 186 countries | Up to 13 April 2020 | None | Annual average temperature, annual relative humidity | Cumulative COVID-19 cases | Correlation | Population density, infant mortality rate, gender ratio, population age structure, life expectancy, human development index, socioeconomic classification, BCG vaccination, lockdown (none, localized or national lockdown), number of days between the first case and lockdown and the number of cases at lockdown | No | Bellali et al. (2020) |
|  | Global (information unavailable) | 1 January to 31 March 2020 | None | 3 month average temperature, precipitation, latitude | Daily COVID-19 cases | Correlation | Population, population density, median age, GCG vaccine policy, | No | Bezabih et al. (2020) |
|  | “four mostly affected places of China and five mostly affected places of Italy” | Up to 13 March 2020 | None | Maximum temperature, relative humidity, wind speed | Daily new COVID-19 cases | Pearson correlation | None | No | Bhattacharjee (2020) |
|  | Wuhan | Not clearly specified | None | Temperature, humidity, precipitation | COVID-19 cases | Not specified | None | No | Bu et al. (2020) |
|  | Global to date of study | Cases reported up to 19 March 2020 | None | Temperature, relative and absolute humidity, wind speed | Daily COVID-19 cases | Visual display of total case counts relative to humidity and temperature | None | No | Bukhari and Jameel (2020) |
|  | China | 25 January to 29 February 2020 | Lag of 6 days | PM2.5, PM10, SO2, NO2 CO, O3. daily mean ambient temperature, relative humidity and wind velocity | Daily and cumulative COVID-19 cases | GAMMS | None | No | Cao et al. (2020) |
|  | Global | The period 22 January and15 March 2020 | None | Temperature, specific humidity | COVID-19 cases | Panel (longitudinal) regression | Population density, various socio-economic and country-specific variables | No | Carlton and Meng (2020) |
| †  ‡ | 173 countries (3235 geospatial units) | 10 January to 10 April 2020 | Lag of 3 days | UV, temperature, humidity, precipitation | Daily cumulative case number growth rate | Distributed lag panel regression models | Population density, socio-economic variation among locations | Yes | Carlton et al. (2020) |
| † | Global, excluding China | Up to 19 March 2020 | None | Temperature, humidity, dew point, precipitation, wind speed | Replication rate, slope the logarithmic curve of confirmed cases, rate of spread, doubling time | Pearson and Spearman correlation | Population data | No | Caspi et al. (2020) |
|  | 430 Cities, districts across China | 20 January to 11 March 2020 | Four time points delays | Temperature, relative humidity, dew point, wind speed | Daily COVID-19 cases | GLM, polynomial regressions | None | No | Chen et al. (2020a) |
|  | China | From January to February | None | Daily average, maximum temperature, minimum temperature, relative humidity, precipitation, air pressure, SO2, CO, O3, NO2, PM2.5, PM10 | Daily COVID-19 cases | GLM | None | No | Chen et al. (2020b) |
| † | Chile (121 cities) organised by climate zone | 23 February to 26 April 2020 | None | Weekly average temperature, relative humidity, atmospheric pressure, windspeed | Weekly case rate | Correlation and GLM | Population size | No | Correa-Araneda et al. (2020) |
|  | Italy (21 regions) and USA (3142 counties) | Up to 7 April 2020 | Lags of 7-14 days | Averaged specific humidity, temperature, UV, precipitation | Cumulative case numbers (8 days) | GLM and GAM | Population size, embarkations (air travel) | Yes | Corripio and Raso (2020) |
|  | Brazil (Belém Metropolitan Region) | 18th March to the 6th of May 2020 | None | Average minimum, maximum temperature, relative humidity, precipitation, wind  speed | Daily COVID-19 cases | Correlation | Gender and gender ratio, populations size, population density, age distribution, | Yes | da Silva et al. (2020) |
|  | China | 20 January to 5 May 2020 | Lag of 14 days | Minimum, maximum and average temperature, humidity, air pressure, PM10, PM2.5, NO2, CO2 | Daily COVID-19 cases | Correlation, Wavelet analysis | None | No | Damette and Goutte (2020) |
|  | India | 18 March to 30 April 2020 | None | 14 day moving average n  temperature, relative humidity, solar radiation, rainfall, wind speed, PM2.5, PM10, SO2, NO2  and CO | Daily COVID-19 cases | Spearman correlation, GAM | None | Yes | Das and Das Chatterjee (2020) |
|  | 204 Countries globally | From January to April 2020 | None | Average minimum, maximum and average temperatures for January to April 2020 | Cumulative total cases critical cases, recoveries to April 2020 | Correlation, GLM | None | No | Das et al. (2020) |
|  | Angola, Burundi, Ethiopia, Malawi, Mauritania, Mozambique, Nicaragua, Papua New Guinea, South Sudan, Uganda, Yemen, Zimbabwe, Nepal, Syria | December 2019 to 26 April 2020 | None | Temperature (classified as ‘hot’ and ‘cold’) | Total cases as on 26 April 2020 | None | Population density | No | de Gennaro (2020) |
|  | India, 5 cities | To 20 May 2020 | 3 days | Daily temperature and relative humidity | Daily COVID-19 cases | Linear mixed model (controlling for city) | None | No | Dixit et al. (2020) |
| †  ‡ | 79 Countries, regions (not named) | 22 January to 31 March 2020 | None | Temperature, specific humidity, PM2.5 | Mean daily growth rate from exponential phase of the growth curve | Linear mixed models | Population size and density, per capita health expenditure, age structure, air pollution | Yes | Ficetola and Rubolini (2020) |
|  | Spain, Madrid and Catalonia regions | April 2020 | None | Mean April temperature | COVID-19 cases (unspecified) | Pearson correlation | Population density | No | Franco and Galo-Fernandez (2020a) |
|  | Spain, Catalonian “comarcas” | April 2020 | None | Mean April temperature | COVID-19 cases (unspecified) | Spearman correlation | Population density | No | Franco and Galo-Fernandez (2020b) |
| § | ‘35 selected countries across the globe’ | From 26 April 2020 | None | 7 Day mean temperature and relative humidity | *R0* | Linear regression (not clearly specified) | Age structure and patterns of contact in each country (unspecified) | Yes | Gao et al. (2020) |
| § | Wuhan and 10 major Chinese cities outside Hubei Province | 18 January to 13 February 2020 | None | Temperature, humidity | *R0* | Linear regression | None | Yes | Guo et al. (2020) |
| §  ‡ | USA | 14 January to 16 April 2020 | None | Mean temperature and humidity (over unspecified period); PM2.5 | *R0* | Multiple regression, support vector machines, decision trees | Median age, population density, per capita GDP | Yes | Gupta and Gharehgozli (2020) |
|  | India, 9 cities | 30 January to 4 June 2020 | 7, 10, 12, 14, 16 days | Maximum, minimum, mean temperature, diurnal temperature range, dew point, mean relative humidity, range in relative humidity, wind speed | Daily COVID-19 cases | Spearman correlation | Population density, elevation | No | Gupta and Pradhan (2020) |
|  | Bangladesh, 6 districts | 8 March to 17 May 2020 | None | Daily temperature, humidity, wind speed | Daily COVID-19 cases | Maps, Spearman and Kendal correlation | None | No | Hasan and Siddik (2020) |
|  | Japan, 19 prefectures | 15 to 25 March 2020 | None | Temperature, absolute humidity | ‘Spread duration’ | Regression | Population density | No | Hirata et al. (2020) |
|  | China, 250 cities | December 2019 to 15 February 2020 | None | Daily temperature, relative humidity, precipitation, wind speed, air pressure, and visibility | ‘number of confirmed COVID-19 infected cases’ (not specified) | Pearson correlation | Population density, mobility | No | Huang et al. (2020) |
|  | Global, 116 countries | 8 January to 12 March 2020 | 7 and 14 day lags | Temperature, humidity, wind speed, UV-index | ‘number of COVID-19 cases’ (not specified) | Multilevel mixed effects negative .binomial regression models | None | No | Islam et al. (2020) |
| §  † | All affected countries, and provinces of China | 31December 2019 to 26 March 2020 | None | Temperature | Exponential rate parameters from infection case vs time curves, *R0* | Regression | None | Yes | Jamil et al. (2020) |
|  | Iraq | 25 February to 17 April 2020 | Lag 3 day | Temperature, relative humidity | *Rt* | Some kind of visual eyeballing | None | No | Jebril (2020) |
| §  † | Chinese Provinces, excl. Qinghai, Tibet, Hong Kong, Macao, Taiwan | Up to 19 February 2020 | None | A ‘comprehensive meteorological index’ incl. ‘air index’, temperature, precipitation, relative humidity, wind power | *R0*, *β* (the contact rate) | Correlation (unspecified) | Migration | Yes | Jia (2020) |
|  | Global, 46 worst affected countries | 31 December 2019 to 29 March 2020 | None | Daily temperature | Daily COVID-19 cases, rates as time from first case to 200 cases | Pearson and Spearman correlation, Student’s *t*-test | None | No | Kotsiou et al. (2020) |
| ‡ | Global, 205 countries and territories | To 2 May 2020 | 1 Week and 1 month prior (mean of influential variable) | Mean, maximum, minimum temperature, atmospheric pressure, mean relative humidity, total rainfall and/or snowmelt, mean visibility, mean wind speed, total days with snow, total days with thunderstorm, total days with fog | Total number of COVID-19 cases, cumulative number of cases at 28 days after the first reported case | Uni- and multivariate negative binomial regression | Age structure, sex ratio, population size, population density, urban population, GDP per capita, Human Development Index, number of airports, number of air travellers per annum; body mass index, obesity, diabetes, smoking, hospital beds, physicians, health expenditure, PM2.5, O3, household air pollution, Climate Risk Index (2018), number of COVID-19 tests performed | Yes | Leung et al. (2020) |
| ‡ | China, Hong Kong, Singapore, | 17 to 25 March 2020 | 12 ± 3 days | Daily temperature and humidity | Transmission rates obtained from SEIR models | Multiple regression | Country-level effects | Yes | Lin et al. (2020) |
|  | Lombardy, Italy | 8 March to 19 June 2020 | 20 days | Minimum, mean, maximum of temperature, dew point, relative humidity, absolute humidity, wind speed, pressure; NO2, PM2.5 | Daily ICU case anomaly | Spearman and Kendal correlation | None (ICU case anomaly data avoids many issues associated with testing and reporting) | No | Lolli et al. (2020) |
|  | Each province in China (incl. Hong Kong), and Japan, Singapore, South Korea, Taiwan, Thailand | 23 January to 10 February 2020 | None | Temperature, absolute humidity | Proxy *Rt* | Linear regression | None | No | Luo et al. (2020) |
|  | India’s Maharashtra, Rajasthan and Kashmir regions | 9 March to 27 May 2020 | None | Temperature | Daily COVID-19 cases | Correlation, regression | None | No | Meraj et al. (2020) |
| †  ‡ | 128 Countries and 98 states or provinces (not named) | Up to 13 April 2020 | None | Temperature, relative humidity, UV radiation | Exponential growth rate of early COVID-19 cases | Bayesian methods, including random (per country) effects | Indoor aggregation, proportion elderly | Yes | Merow and Urban (2020) |
|  | 15 German state capitals | 1 March to 8 May 2020 | None | Mean temperature, humidity | Daily COVID-19 cases | None, visual examination of graphs | Population density | Yes | Munnangi et al. (2020) |
|  | Spanish autonomous communities | October 2019 to 15 April 2020 | None | Temperature, relative humidity, UV-radiation | Cumulative COVID-19 cases during the previous 14 days, total cases, newly diagnosed cases, hospital admissions, intensive care unit admissions | Spearman correlation, linear regression | None | No | Muñoz-Cacho et al. (2020) |
|  | USA counties | 22 January to 13 June 2020 | None | Temperature | Daily COVID-19 cases | Linear regression, generalized method of moments | Population density | No | NoghaniBehambari et al. (2020) |
| † | Global | 23 January to 1 March 2020 | None | Mean temperature for March | Parameters estimated from curves fitted to the infection vs. time | Exponential model, GLM, other parametric models | None | No | Notari (2020) |
| † | Mainland China | 23 January to 1 March 2020 | None | Temperature, humidity, precipitation, wind speed | Doubling time | Exponential and linear models | Cultural aspects, policies adopted to contain the virus | No | Oliveiros et al. (2020) |
|  | Global, ~230 cities | January to April 2020 | None | Mean diurnal temperature range, temperature seasonality; humidity | ‘COVID-19 cases’ (not specified) | Boosted regression trees | Annual Parasite Index, international travel | No | Pramanik et al. (2020) |
|  | Australia, China, France, Germany, Iran, Italy, Japan, Singapore, South Korea, Spain, Switzerland, USA | 31 January to 28 February 2020 | None | Temperature, relative humidity | Daily confirmed COVID-19 cases | Linear regression | None | No | Rahman et al. (2020a) |
|  | Global, 149 countries | 1 January to 10 May 2020 | None | Maximum, minimum, mean temperatures, and temperature extreme | Rate of spread of COVID-19 (total confirmed cases/total test performed) × 100) | Partial correlation analysis and linear mixed effect model | Population density, population growth rate, GDP growth rate, GDP per capita, life expectancy, % population over 60 years, health expenditure, physicians per thousand people; number of threatened species, forested area, CO2 emission, area % of the forested area protected | No | Rahman et al. (2020b) |
|  | Global | January to April 2020 | None | Temperature, specific humidity, dew point temperature, air pressure, wind speed and total precipitation | Log monthly COVID-19 cases | Pearson correlation | None | No | Rasul and Balzter (2020) |
|  | Global, 118 countries (popl. > 5 mil.) | 2 March to 30 June 2020 | None | Monthly temperature | Monthly COVID-19 cases | Correlation, non-linear curve fitting | Population density | No | Ren and Chen (2020) |
|  | Italy | 24 February to 15 April 2020 | None | Mean February temperature, relative humidity, air pollution | Daily COVID-19 cases | Bayesian model averaging | Population density, policy lags, number of tests, health spending, proportions of young and old in population, social mobility | No | Rios and Gianmoena (2020) |
|  | São Paulo, Brazil | 26 February to 6 April 2020 | None | Temperature, relative humidity, atmospheric pressure, wind speed | Daily COVID-19 cases | Spearman correlation, GLM with negative binomial distribution | None | No | Rodrigues et al. (2020) |
|  | Global | 31 December 2019 to 3 April 2020 | None | Temperature climatologies | COVID-19 cases (unspecified) | t-test of categories of temperatures globally, mapping | Population size | Yes | Roy (2020) |
| † | Bushehr, Iran | From April to 12 June 2020 | None | Monthly mean temperature | Daily COVID-19 cases, *Rt*, parametric estimates | None | None | No | Sahafizadeh and Sartoli (2020) |
|  | Global | 23 January to 11 April 2020 | 5-days | Temperature | Daily COVID-19 cases | Wilcoxon test | None | No | Sethwala et al. (2020) |
|  | Spain, incl. Castilla y Leon, Castilla-La Mancha, Catalonia, Madrid | February to 17 April 2020 | None | Daily mean temperature, PM2.5 | Daily COVID-19 cases | Pearson, Spearman and Kendall correlations; panel and quantile regressions | None | No | Shahzad et al. (2020) |
|  | 31 Provinces in mainland China, incl. Wuhan city | 20 January to 25 February 2020 | None | Temperature, absolute humidity | Daily confirmed COVID-19 cases | Regression | None | No | Shi et al. (2020) |
|  | India, incl. Maharashtra, Delhi, Rajasthan, Gujarat, Tamilnadu, and Madhya Pradesh | From April 2020 | 7-days | Mean temperature, maximum relative humidity, maximum wind speed | Daily COVID-19 cases | Kendall and Spearman correlation | None | Yes | Singh and Agarwal (2020) |
| † | Mexico, 45 cities | 26 February to 3 May 2020 | None | Daily maximum temperature and humidity, UV-radiation | Weekly increment in COVID‐19 cases, transmission rates (slope of log-case vs. time per city) | Pearson correlation, multiple regression | Altitude | No | Skutsch et al. (2020) |
|  | 57 Countries | 9 January to 25 March 2020 | None | Daily mean temperature and relative humidity | Daily COVID-19 cases | Quadratic and linear regressions | None | No | Sobur et al. (2020) |
|  | Japanese prefectures | From January 2020 | None | Monthly mean temperature, wind speed, air pressure, relative humidity, sunshine; maximum UV index; total sunshine duration and precipitation | Cumulative COVID-19 cases | Random-effects meta-regression | Population density | No | Takagi et al. (2020) |
|  | Global, 138 countries | 22 January to 17 May 2020 | None | Duration of sunshine, minimum and maximum temperature | Daily COVID-19 cases | Spearman correlation, linear regression | Population density, median age, Global Health Security | No | Thangariyal et al. (2020) |
| †  ‡ | Global | 1 January to 11 March 2020 | None | Daily and monthly mean temperature and precipitation | Cumulative COVID-19 cases, transmission rates estimated by logistic regression for each locality | GAM | Population density, GDP, policy intervention | Yes | Wan et al. (2020) |
|  | 100 Chinese cities | To 23 January 2020 | None | Temperature, relative humidity | *Rt* | Panel regressions (mixed model) | GDP per capita, population density, number of hospital beds, fraction of population over 65 | No | Wang et al. (2020a) |
|  | China and “26 overseas countries” | 20 January to 4 February 2020 | None | Mean, maximum, minimum temperature | Cumulative number of COVID-19 cases | GLM | None | No | Wang et al. (2020b) |
|  | Global, 116 countries/territories | December 2019 to May 2020 | None | Maximum temperature, relative humidity, rainfall, sunshine, UV-radiation | Monthly COVID-19 cases | Correlation, non-linear regression | Latitude | No | Wen and Chen (2020) |
|  | China | January to February 2020 | None | Mean temperature, specific humidity, UV-radiation | Daily COVID-19 cases | None | None | No | Wen et al. (2020) |
| †  ‡ | USA, county-level | Late January to 28 June 2020 |  | Daily maximum temperature, minimum temperature, precipitation, snowfall | Rate of daily new and cumulative COVID-19 cases | Panel local projections estimator | Google Mobility Reports; Dallas Fed Mobility and Engagement Index; nursing home population size; potential contemporaneous reverse causality; growth in testing | Yes | Wilson (2020) |
|  | Global | 12 December 2019 to 22 April 2020 | None | Daily minimum and maximum temperature, humidity, precipitation, snowfall, moon illumination, sunlight hours, UV index, cloud cover, wind speed and direction, air pressure; O3, NO2, SO2, PM2.5 | *Rt* | Linear models | Population density; social distancing interventions; various location-specific fixed effects | Yes (?) | Xu et al. (2020b) |
|  | China, 120 cities | 15 January to 18 March 2020 | 0, 3, 7 and 14 day lags | Mean temperature and  diurnal range, relative humidity, wind velocity, air pressure, precipitation, hours of sunshine; PM2.5, NO2, SO2, CO, O3 | Daily COVID-19 cases | Spearman correlation, uni- and multivariate negative binomial GLM | None | No | Zhou et al. (2020) |
|  | China, 27 provincial capitals, 4 metropolitan cities | 1 February to 31 March 2020 | None | Temperature, humidity, visibility, wind speed, air pressure; aerosol data | Daily COVID-19 cases | Compound natural factor models | Vegetation data | No | Zuo et al. (2020) |

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