covid19

March 17, 2020

Analysis of recent coronavirus data for different countries and regions.
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More info in https://github.com/jmoldon/coronavirus_analysis

1 General statistics

Data comes from Johns Hopkins University at https://github.com/CSSEGISandData/COVID-19
that is updated daily.

1.1 List of most affected countries (sorted by number of confirmed cases)

Country/Region	Province/State	Confirmed	Deaths	Recovered
China	Hubei	67798	3099	55142
Italy		27980	2158	2749
Iran		14991	853	4590
Spain		9942	342	530
Korea, South		8236	75	1137
Germany		7272	17	67
France	France	6633	148	12
Switzerland		2200	14	4
United Kingdom	United Kingdom	1543	55	20
Netherlands	Netherlands	1413	24	2
China	Guangdong	1361	8	1306
Norway		1333	3	1
China	Henan	1273	22	1250
	Zhejiang	1231	1	1216
Sweden		1103	6	1
Belgium		1058	5	1
China	Hunan	1018	4	1014
Austria		1018	3	6
China	Anhui	990	6	984
US	New York	967	10	0

1.2 List of most affected countries/provinces (sorted by number of deaths)

```
                                 Confirmed  Deaths  Recovered
Country/Region Province/State
China          Hubei               67798     3099      55142
Italy                              27980     2158       2749
Iran                               14991      853       4590
Spain                               9942      342        530
France         France              6633      148         12
Korea, South                        8236       75       1137
United Kingdom United Kingdom       1543       55         20
US             Washington           904        48          1
Japan                               839        27        144
Netherlands    Netherlands         1413        24          2
China          Henan               1273        22       1250
US             King County, WA       83        17          1
Germany                             7272        17         67
Switzerland                         2200        14          4
China          Heilongjiang         482        13        455
Philippines                         142         12          2
US             New York             967         10          0
Iraq                                124         10         26
China          Guangdong           1361          8       1306
               Beijing              452          8        360
```

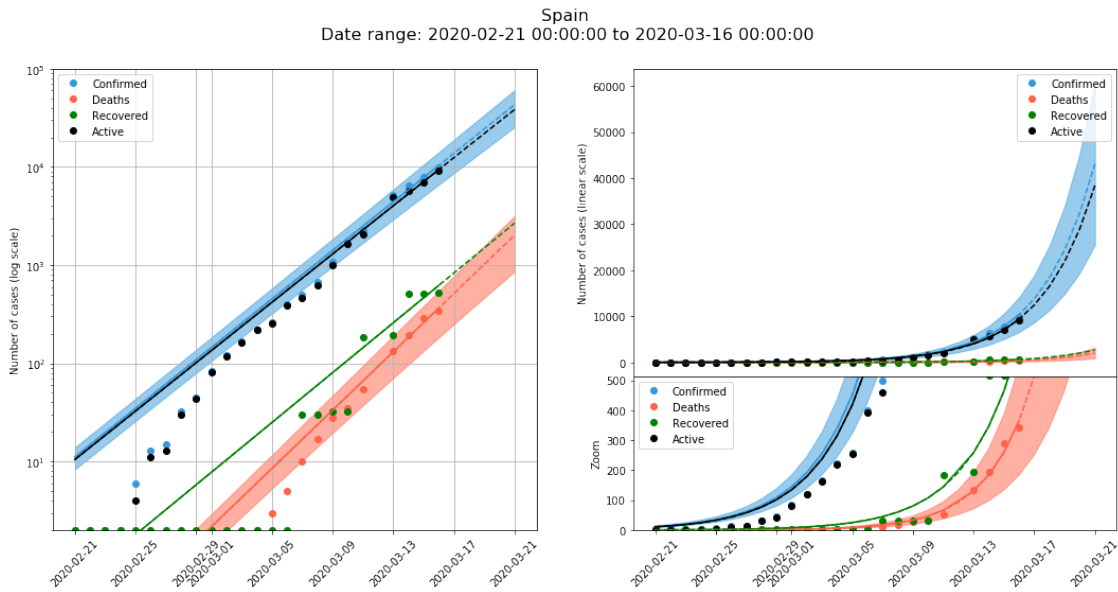# 2 Evolution of cases (Confirmed, Deaths, Active and Recovery) per country

All plots have the same information. Left: log scale, right: linear scale. Bottom-right: is a zoom to show the correct scale for deaths. The straight line is a fit to a logistic growth when possible. If the fit does not converge (low number of points in early stages) a simple exponential is used. The dashed line is a prediction based on the fit.
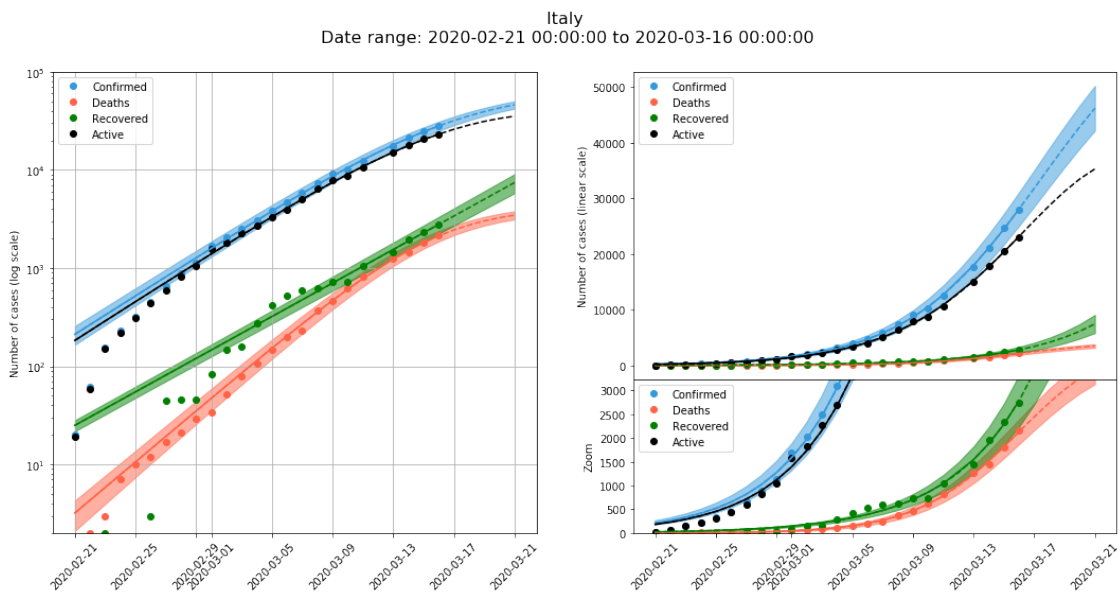
3 Europe

3.1 Spain

5 day prediction

<pandas.io.formats.style.Styler at 0x7fa4eba6a7f0>

Spain
Date range: 2020-02-21 00:00:00 to 2020-03-16 00:00:00

3.2 Italy

5 day prediction

```
<pandas.io.formats.style.Styler at 0x7fa4e9d2a908>
```


Italy
Date range: 2020-02-21 00:00:00 to 2020-03-16 00:00:00

3.3 France

5 day prediction

<pandas.io.formats.style.Styler at 0x7fa4eb694e10>

France France
Date range: 2020-02-22 00:00:00 to 2020-03-16 00:00:00
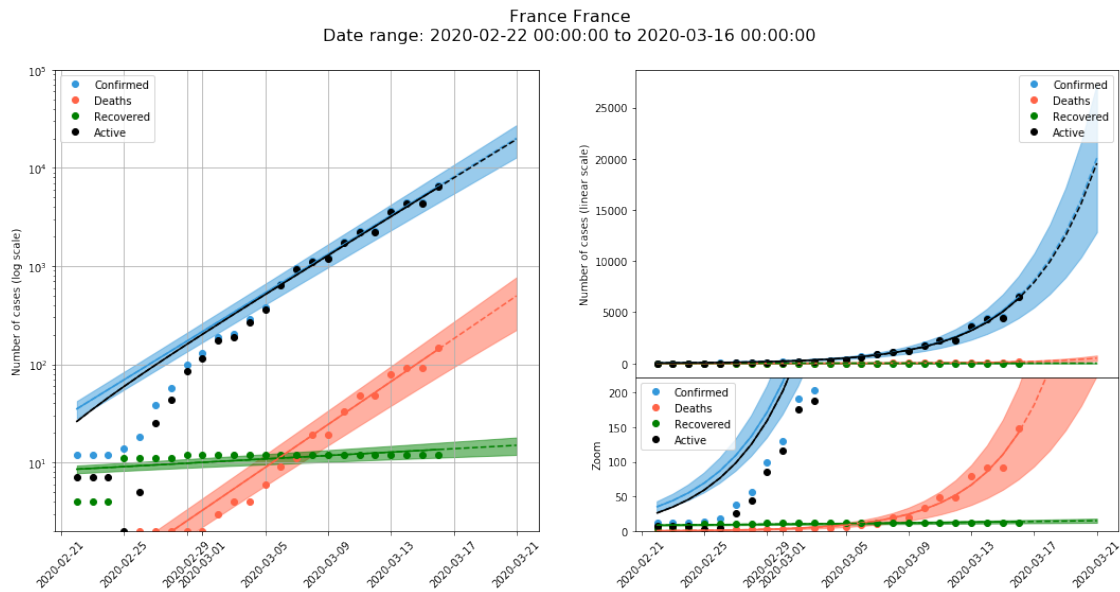
3.4 Germany

5 day prediction

<pandas.io.formats.style.Styler at 0x7fa4ec6df518>

Germany
Date range: 2020-02-22 00:00:00 to 2020-03-16 00:00:00
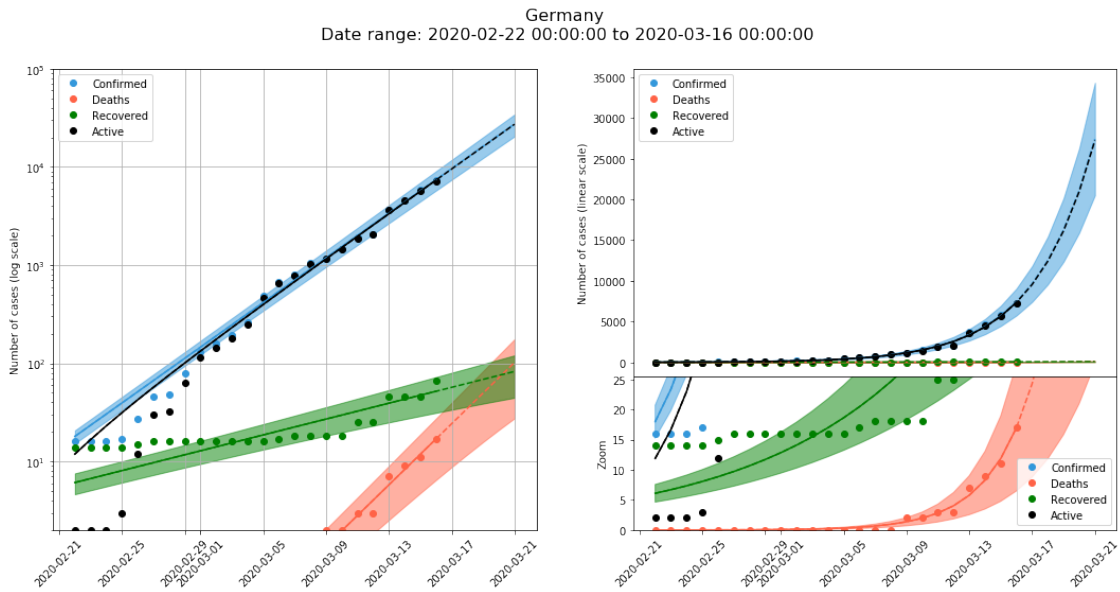
3.5 United Kingdom

5 day prediction

```
<pandas.io.formats.style.Styler at 0x7fa4eb3b1e48>
```


United Kingdom United Kingdom
Date range: 2020-02-22 00:00:00 to 2020-03-16 00:00:00
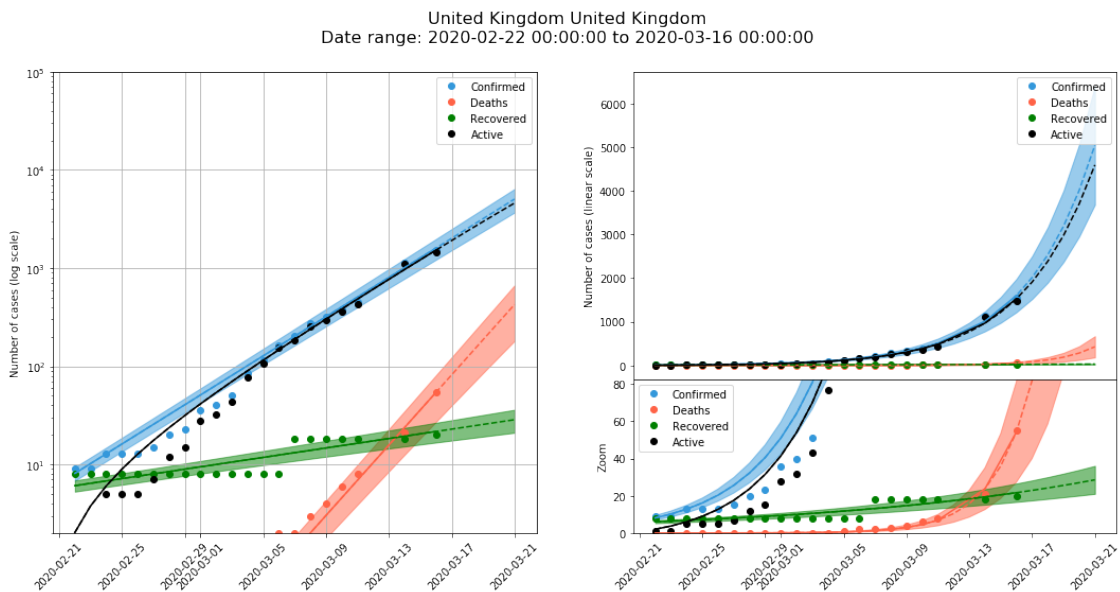
3.6 Sweden

5 day prediction

`<pandas.io.formats.style.Styler at 0x7fa4eb5ca160>`

Sweden
Date range: 2020-02-22 00:00:00 to 2020-03-16 00:00:00
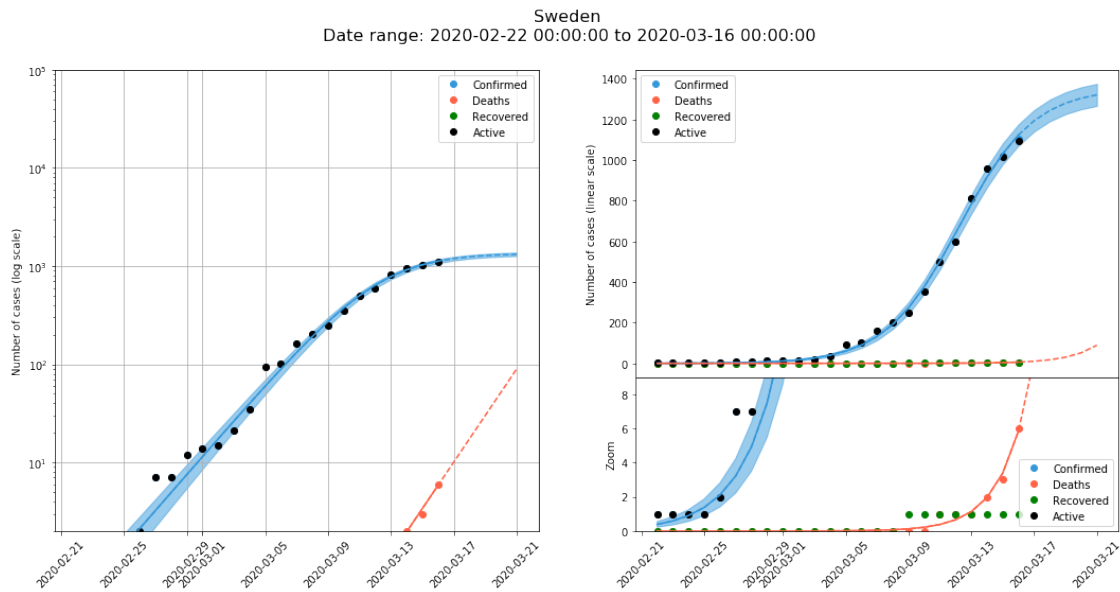
3.7 Netherlands

5 day prediction

`<pandas.io.formats.style.Styler at 0x7fa4eb9c5860>`

Netherlands Netherlands
Date range: 2020-02-22 00:00:00 to 2020-03-16 00:00:00
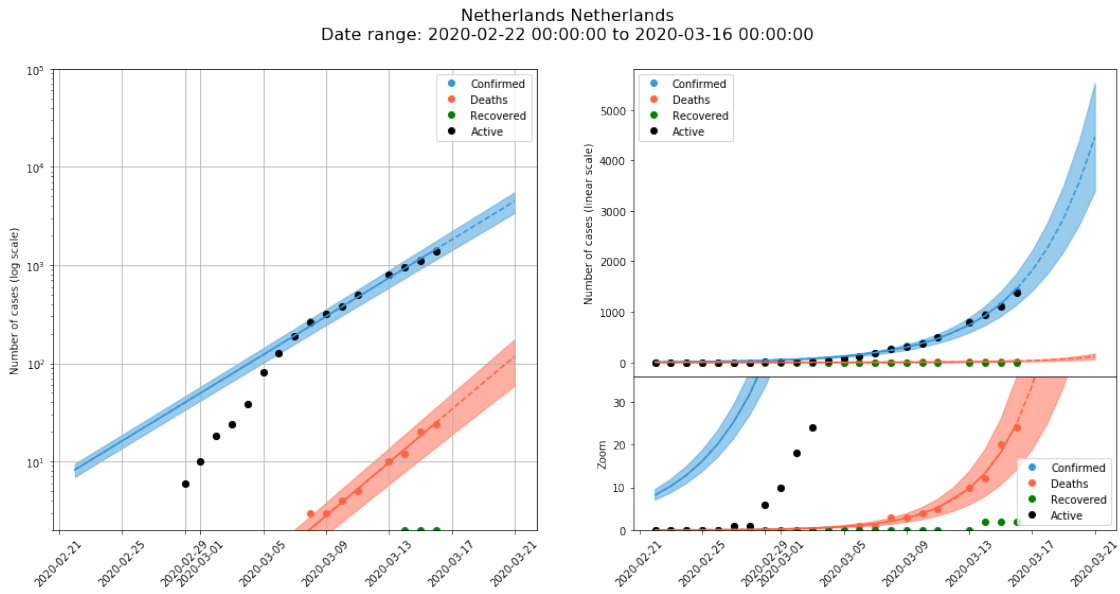
3.8 Poland

5 day prediction

```
<pandas.io.formats.style.Styler at 0x7fa4eb954b38>
```

Poland
Date range: 2020-02-22 00:00:00 to 2020-03-16 00:00:00
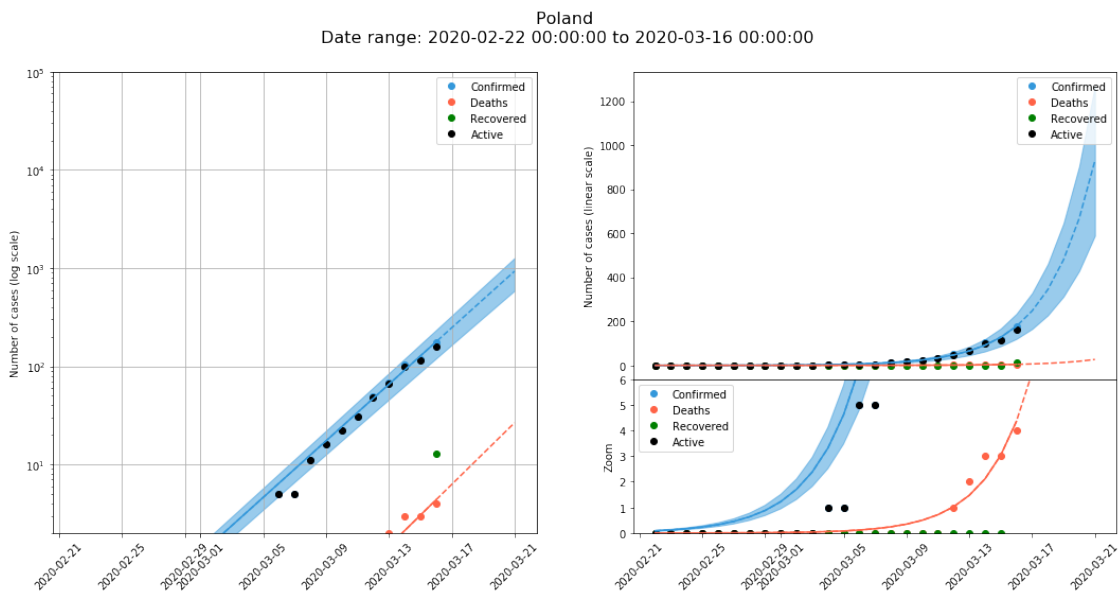
4 United States

I use the combined data for all the states combined

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<class 'pandas._libs.tslibs.timestamps.Timestamp'>
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5 day prediction
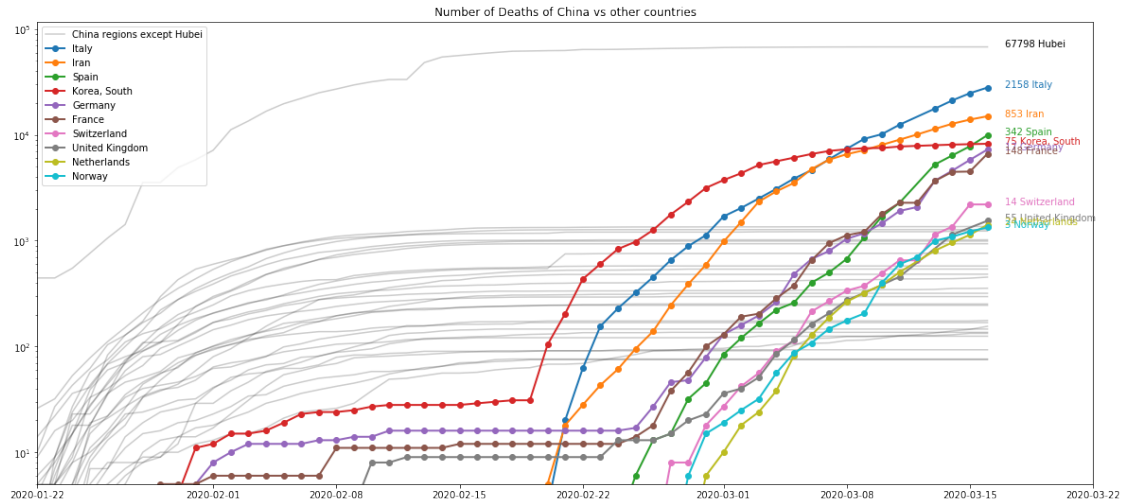
```
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```


US
Date range: 2020-02-25 00:00:00 to 2020-03-16 00:00:00
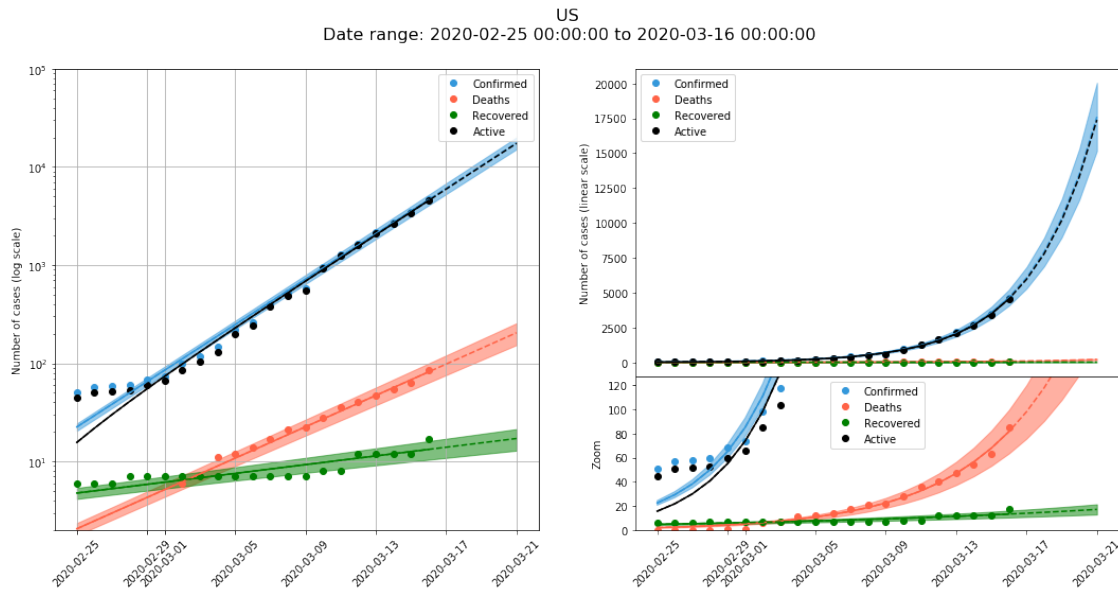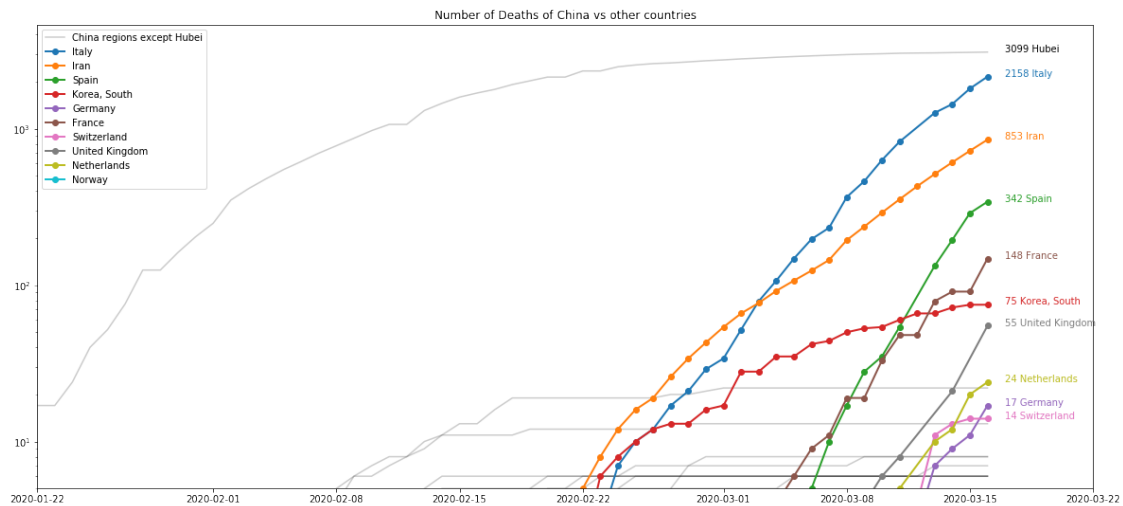
5 Comparison of growth China Regions vs Other countries

These plots show the importance of rapid response and efficient control measures of infected people in China. Except for Hubei region, where the expansion of the virus was unexpected, the other regions have a very reduced number of Deaths in total. The other countries, especially in Europe, even with a month for preparation, shows very high infection and death rates.
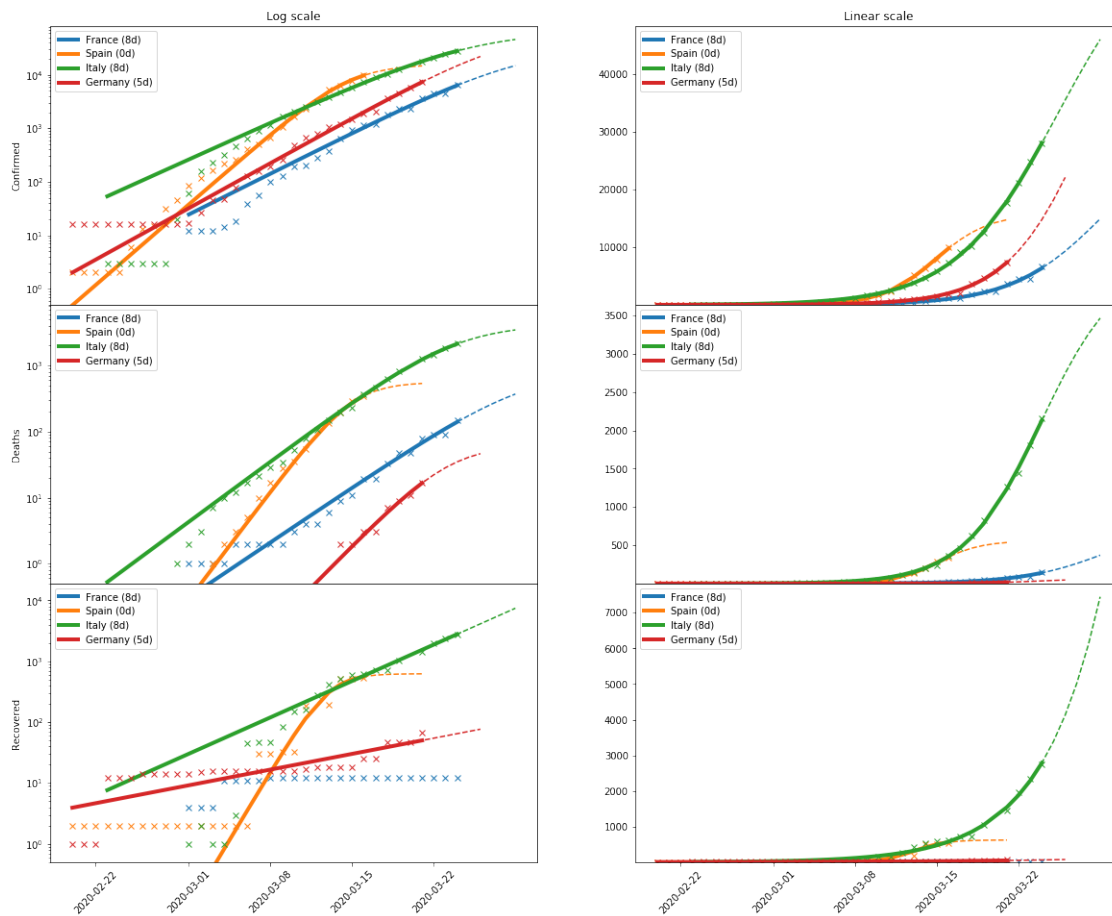
### 5.0.1 Confirmed Cases

Number of Deaths of China vs other countries

67798 Hubei

2158 Italy

853 Iran

342 Spain
75 Korea, South
148 France

14 Switzerland
55 United Kingdom

3 Norway

China regions except Hubei
Italy
Iran
Spain
Korea, South
Germany
France
Switzerland
United Kingdom
Netherlands
Norway

5.0.2 Deaths

Number of Deaths of China vs other countries

3099 Hubei

2158 Italy

853 Iran

342 Spain

148 France

75 Korea, South

55 United Kingdom

24 Netherlands
17 Germany
14 Switzerland

China regions except Hubei
Italy
Iran
Spain
Korea, South
Germany
France
Switzerland
United Kingdom
Netherlands
Norway

# 6 Comparison of different countries, with a manual time delay to align them

## 6.1 Early onset: China regions

Most of the regions have almost completed the cycle and active cases are disappearing. Note that China Hubei (the original area) has a large number of confirmed cases (70000), but the other regions have very low number of cases, with number around 1200-500 or even less.

China Hubei
Date range: 2020-01-22 00:00:00 to 2020-03-16 00:00:00
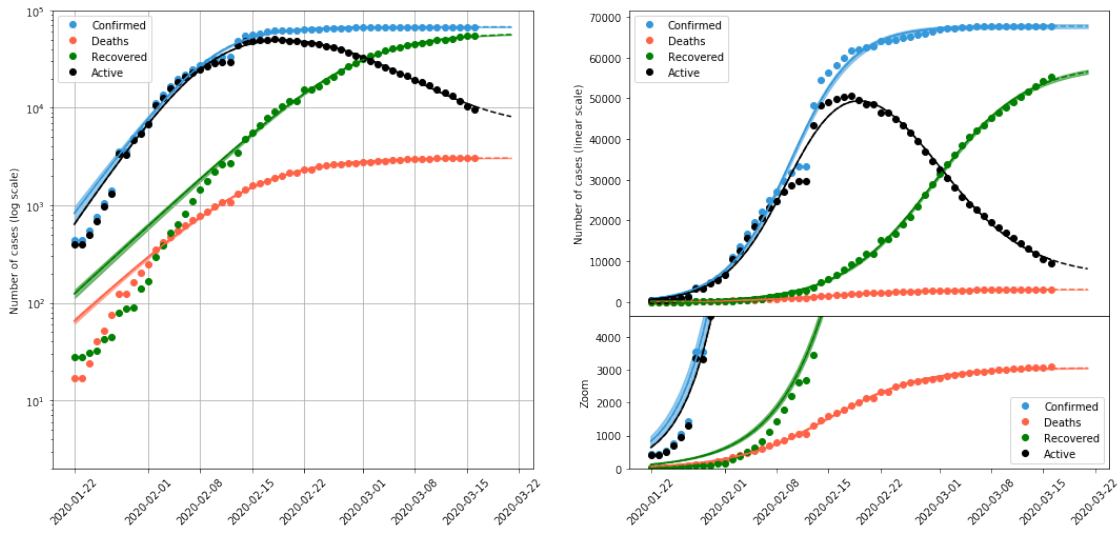
China Henan
Date range: 2020-01-22 00:00:00 to 2020-03-16 00:00:00

China Heilongjiang
Date range: 2020-01-22 00:00:00 to 2020-03-16 00:00:00

China Beijing
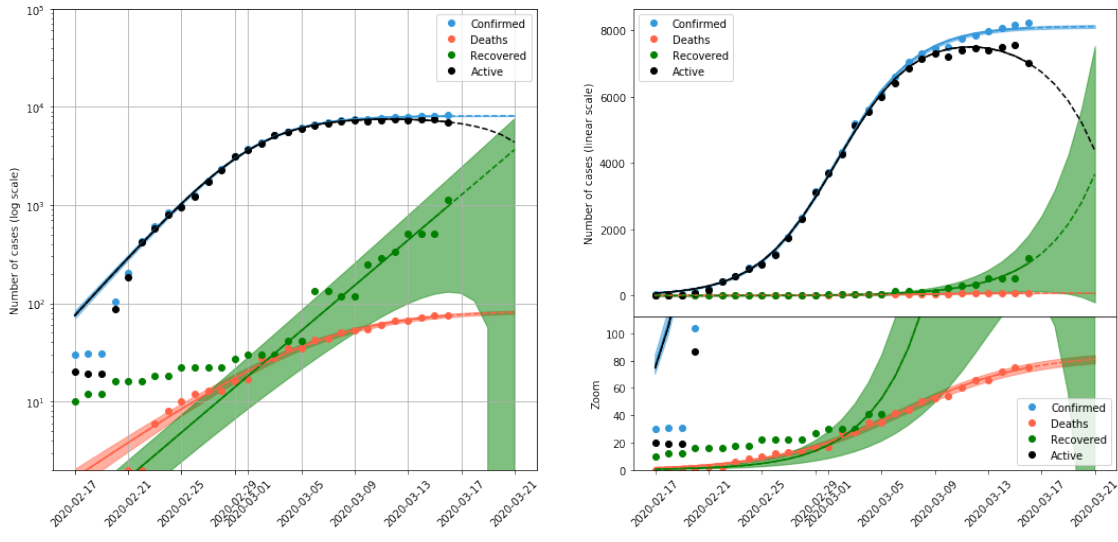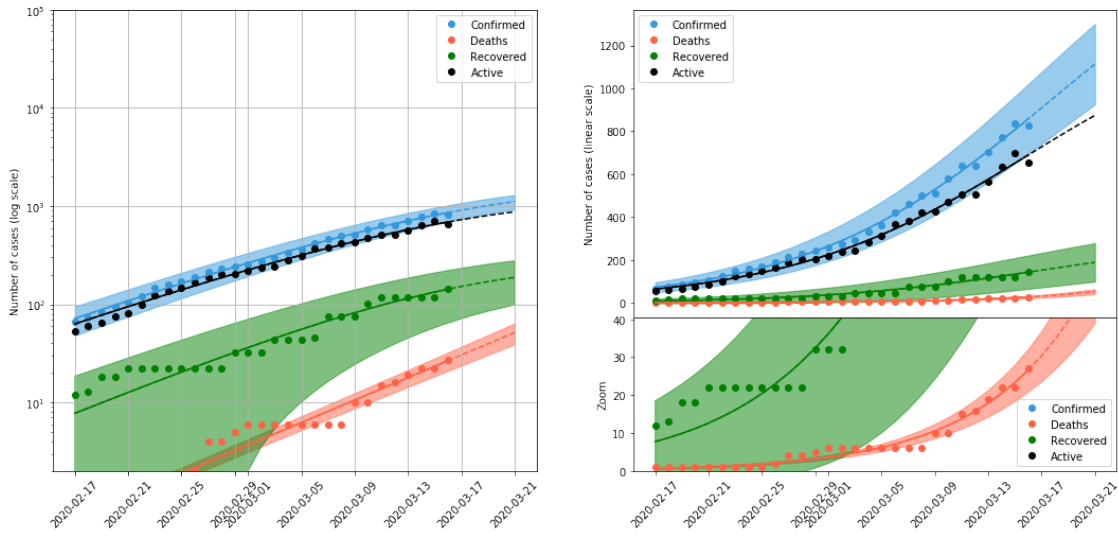Date range: 2020-01-22 00:00:00 to 2020-03-16 00:00:00
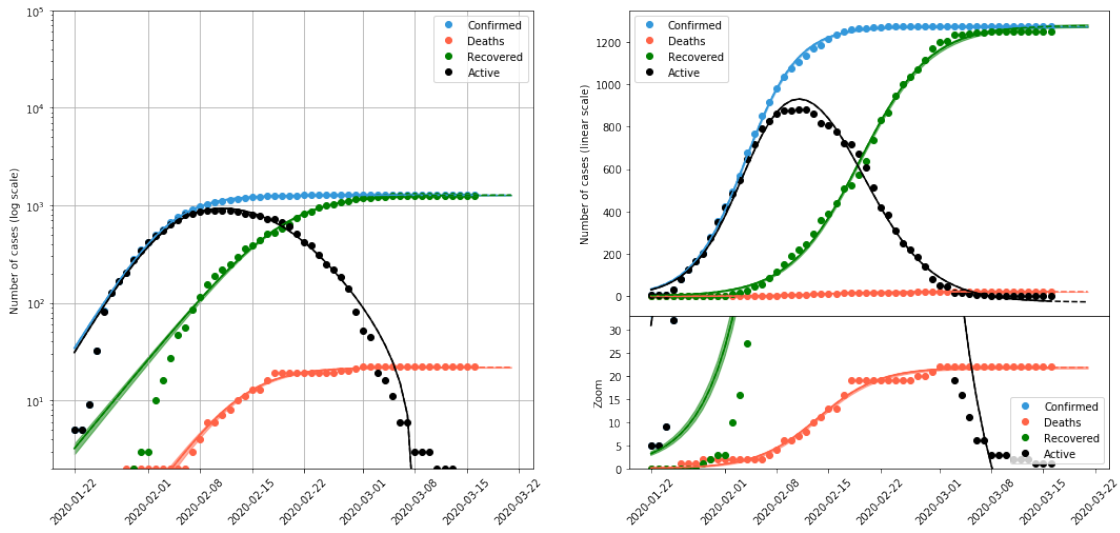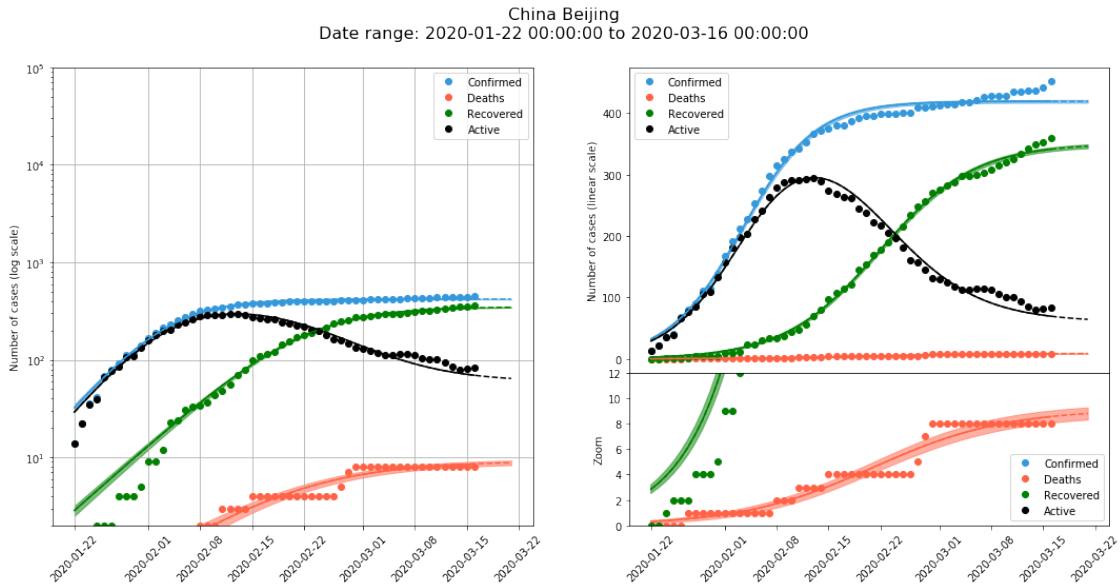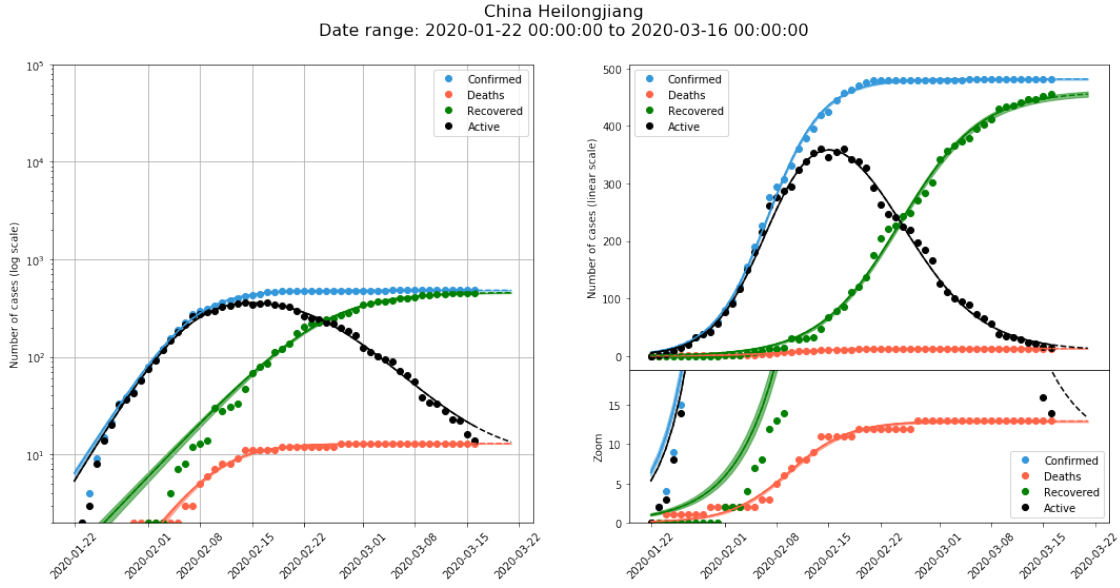
6.2 Other countries in Asia

South Korea has a remarkable recovery rate, with many cases and a reduced number of deaths. Japan growth is moderate, much smaller than in European countries. Iran is showing hints of flattening, although it is curious that the number of recoveries has significantly slowed down while the number of deaths still follow a very exponential trend.

Korea, South
Date range: 2020-02-17 00:00:00 to 2020-03-16 00:00:00

Japan
Date range: 2020-02-17 00:00:00 to 2020-03-16 00:00:00

Iran
Date range: 2020-02-17 00:00:00 to 2020-03-16 00:00:00