

Bulletin GPoM-epidemiologic no 3

Coronavirus Covid-19 epidemic

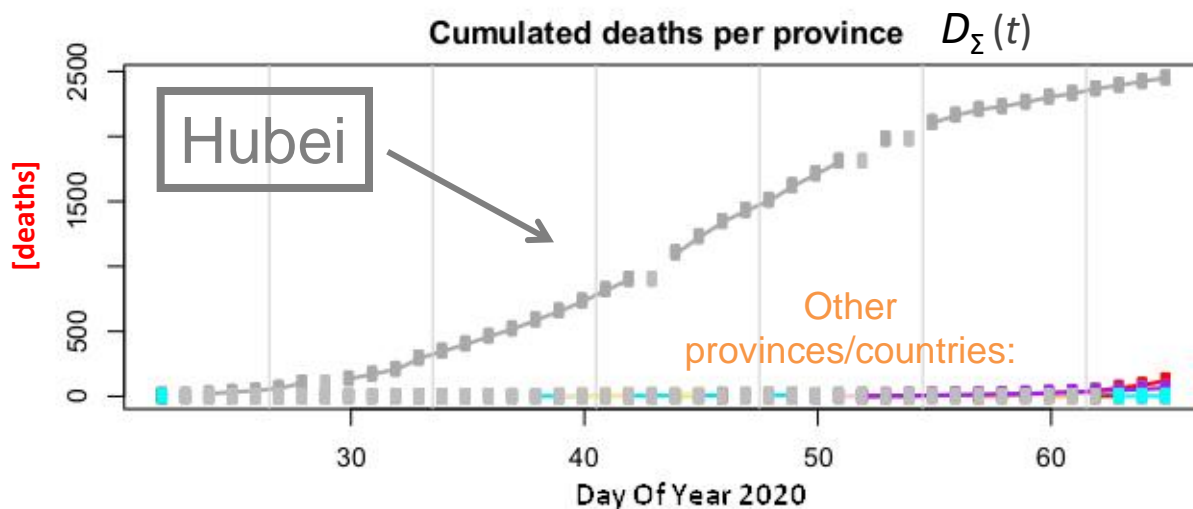
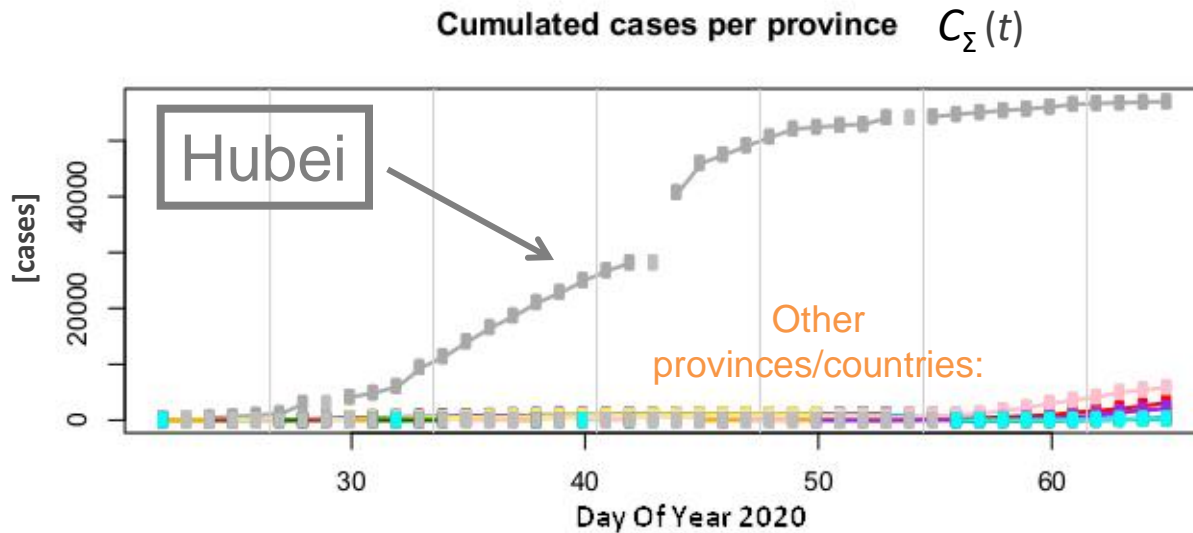
(2019-2020)

6 Mars 2020 Erratum

Axes on slides 2, 4 and 5 have
been corrected in red



Cumulated cases and deaths per province/country (coronavirus Covid-19)



Data from
CSSE JHU

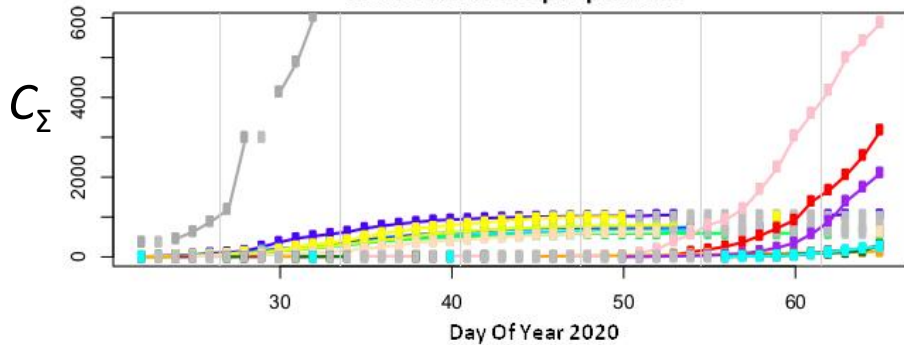


The Hubei and the other provinces

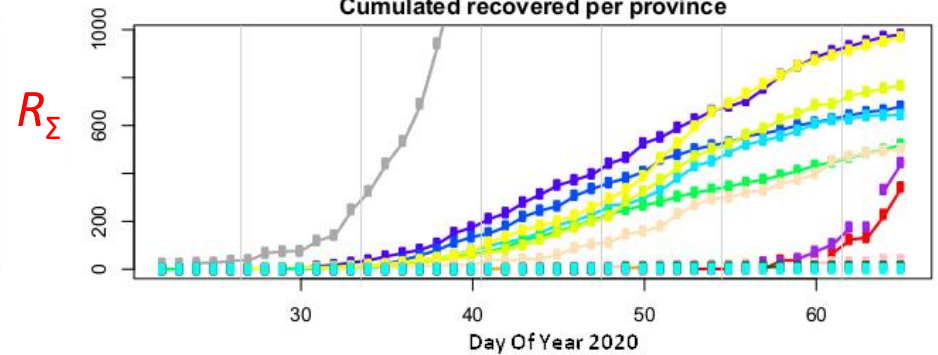
- The magnitude of the outbreak in the Hubei province (here arbitrarily referred as level 6) is 50 times larger than in the other most affected provinces in China (Zhejiang, Hunan, Henan, Gouangdong, Jiangxi, Anhui and Heilongjiang)

Culumated cases, deaths and recovered

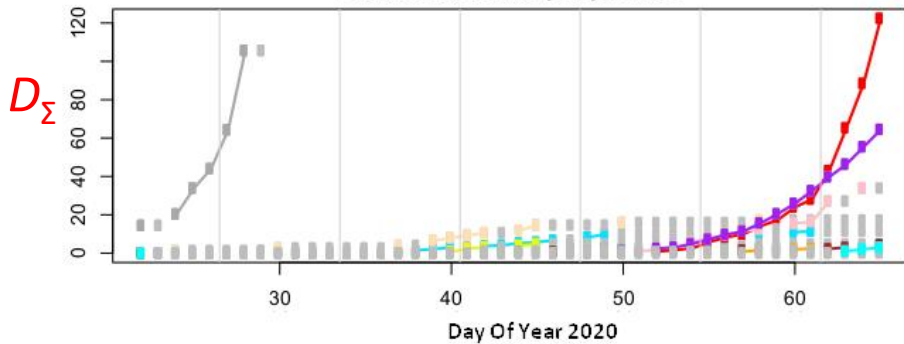
Cumulated cases per province



Cumulated recovered per province

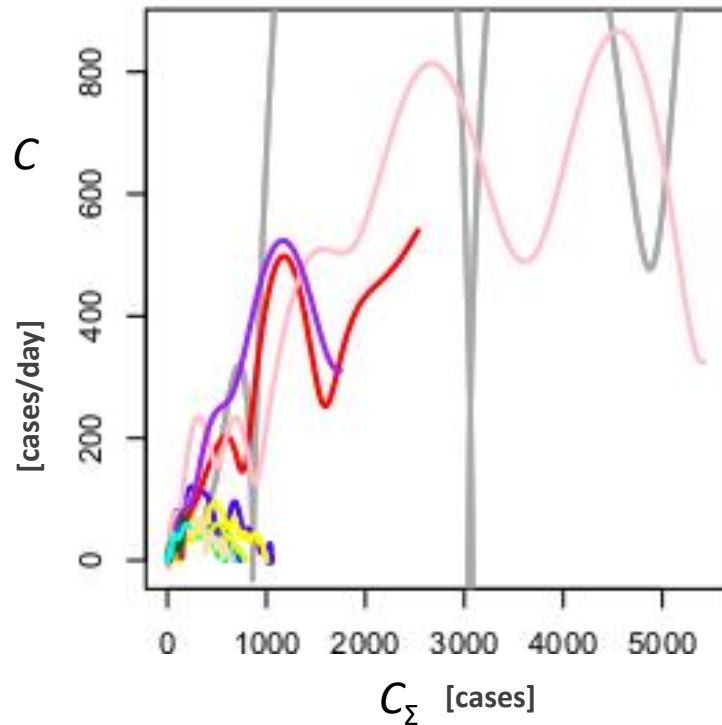


Cumulated deaths per province

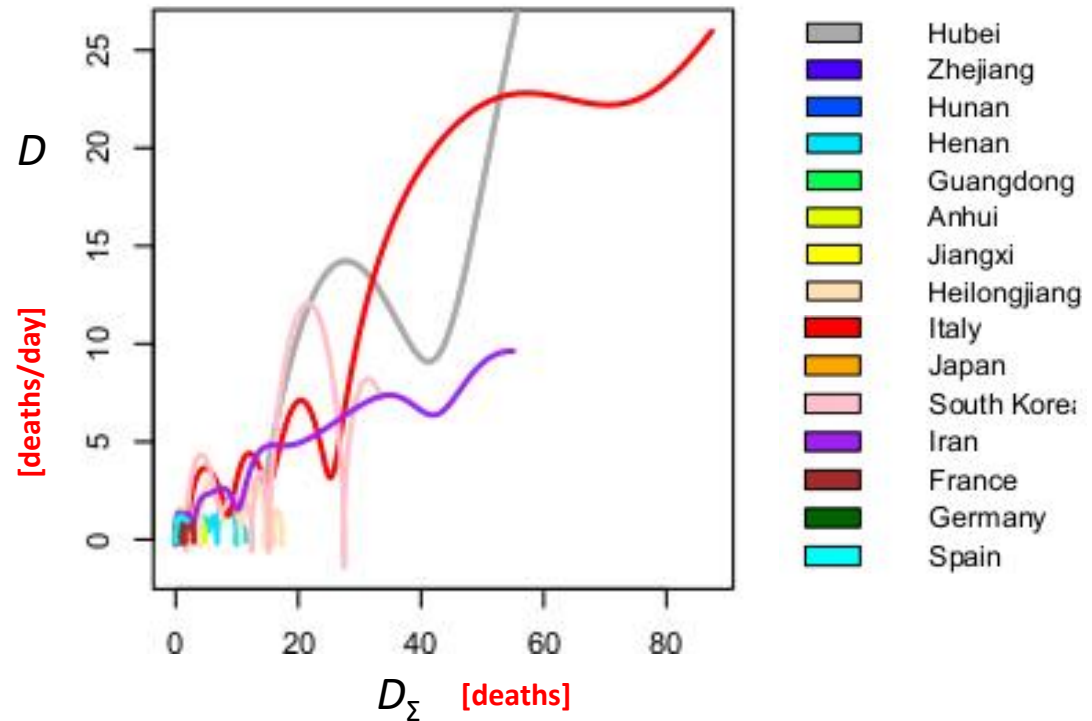


Phase portraits (C_Σ, C) and (D_Σ, D) per province/country (coronavirus Covid-19)

(C_Σ, C)



(D_Σ, D)



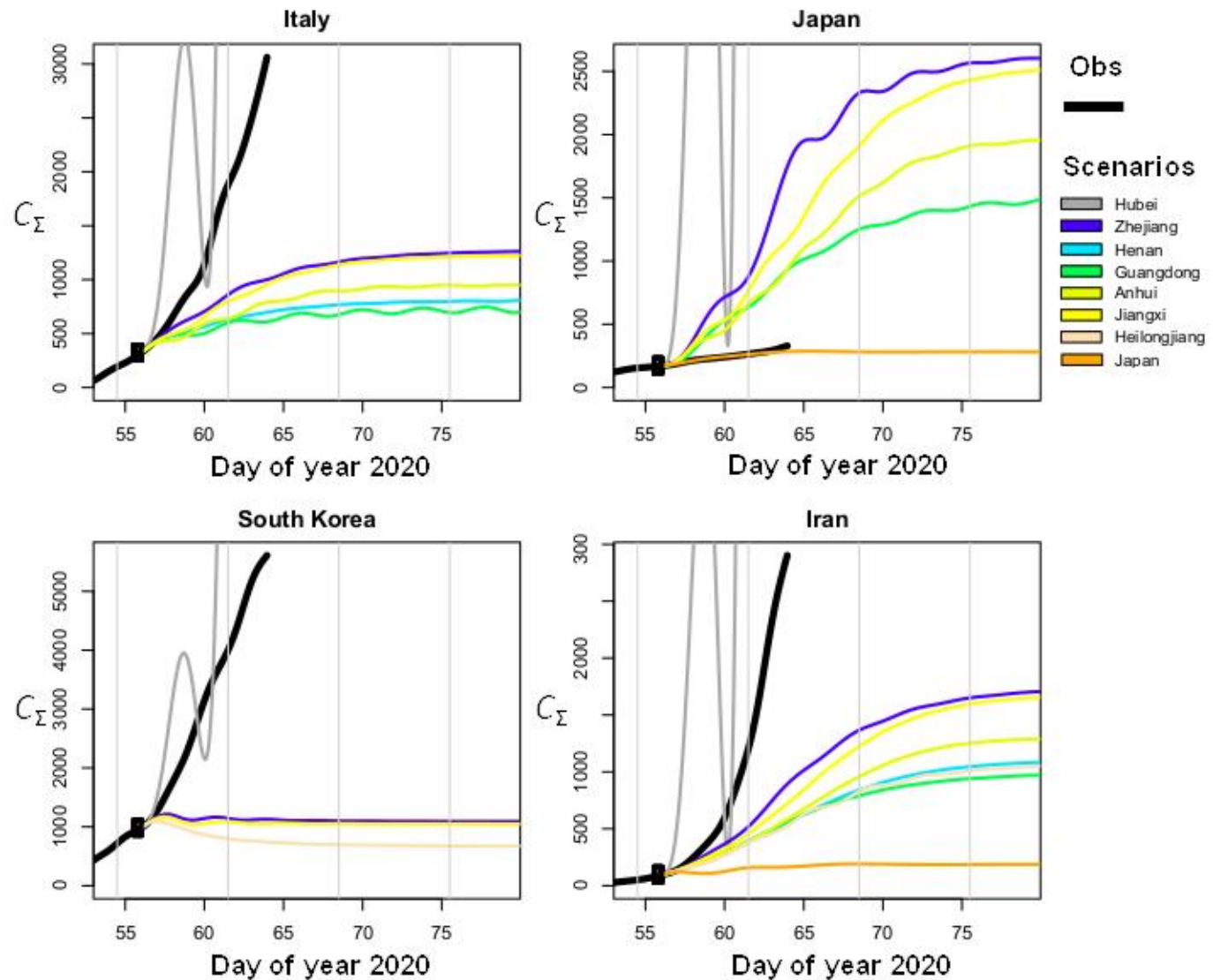
Comparison

- Obviously, the local magnitude of the outbreaks in South Korea, Italy and Iran has already overpassed the level observed in Zhejiang, Hunan, Henan, Gouangdong, Jiangxi, Anhui and Heilongjiang showing the need of an intermediate level in between Hubei and these provinces
- Level 6: Hubei
- Level 5: South Korea, Italy, Iran
- Level 4: Zhejiang, Hunan, Henan, Gouangdong, Jiangxi, Anhui, Heilongjiang, France, Germany, Spain
- Level 3: Japan

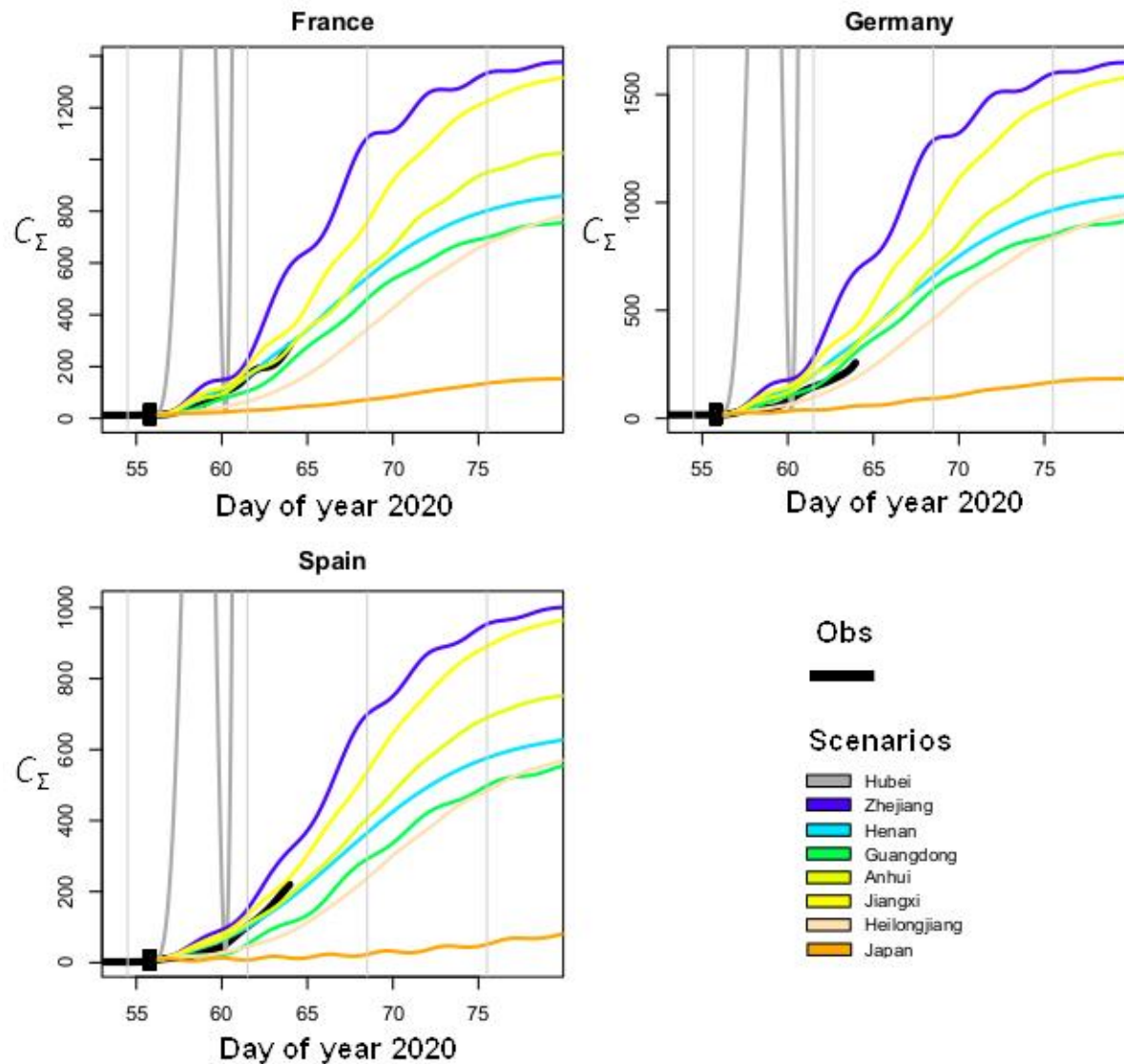
Scenarios

- Models of canonical form (formulated from a single variable) were obtained for several chinese provinces or countries (for which the outbreak has been long enough to obtain a model). These models can be separated in different classes depending on the magnitude of the outbreak: (6) the Hubei, (4) the Zhejiang, Guangdong, Henan, Hunan, Anhui, Jiangxi and (3) the Heilongjiang and Japan.
- These models were used to generate scenarios in countries located outside China, focusing on the locations where new outbreaks of Covid-19 have started: South Korea, Italy, Iran, France, Germany, Japan and Spain (the number of inhabitants per provinces and per country is taken into account in the simulations)
- These simulations can then be compared to the recent observations in order to evaluate the most similar scenarios
- ... and then be used to perform forecasts

Scenarios (Cumulated cases)



Scenarios (Cumulated cases)



Synthesis

The outbreak magnitude in South Korea, Italy and Iran has clearly overpassed the level 4

Considering the scenarios, the outbreak in Germany, France and Spain is at level 3, more precisely

- Germany: in between Heilongjiang and Gouangdong
- Spain: in between Anhui and Jiangxi
- France: in between Henan and Anhui

These levels can still evoluate. In particular, note that a quick increase was observed in Italy after having reached 200 cases of infection