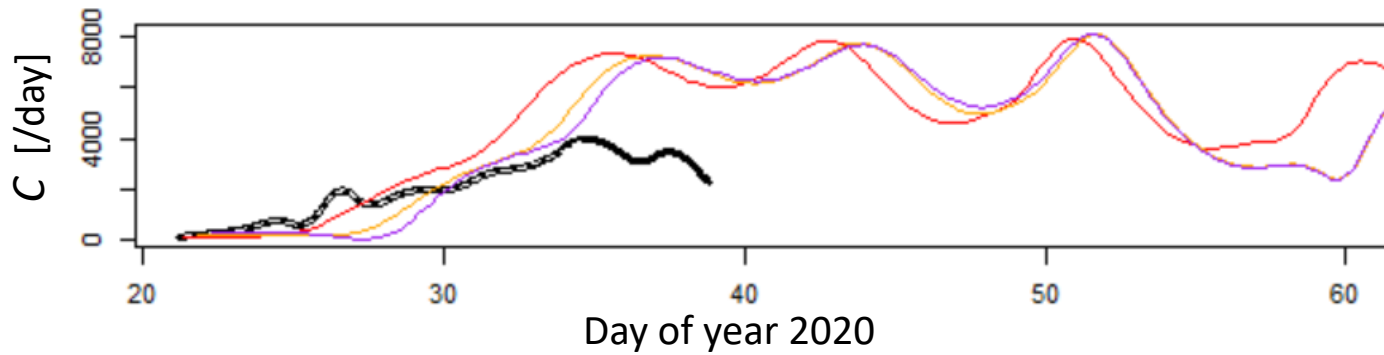


Bulletin GPoM-epidemiologic no 1 Coronavirus 2019-nCov epidemic in China (2019-2020)

9 February 2020

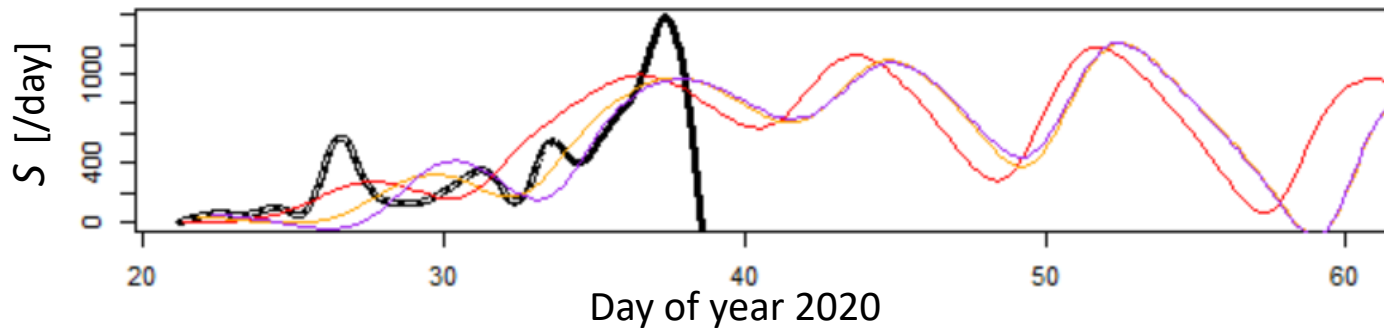


Daily number of Confirmed cases due to coronavirus 2019-nCoV



— Observations*

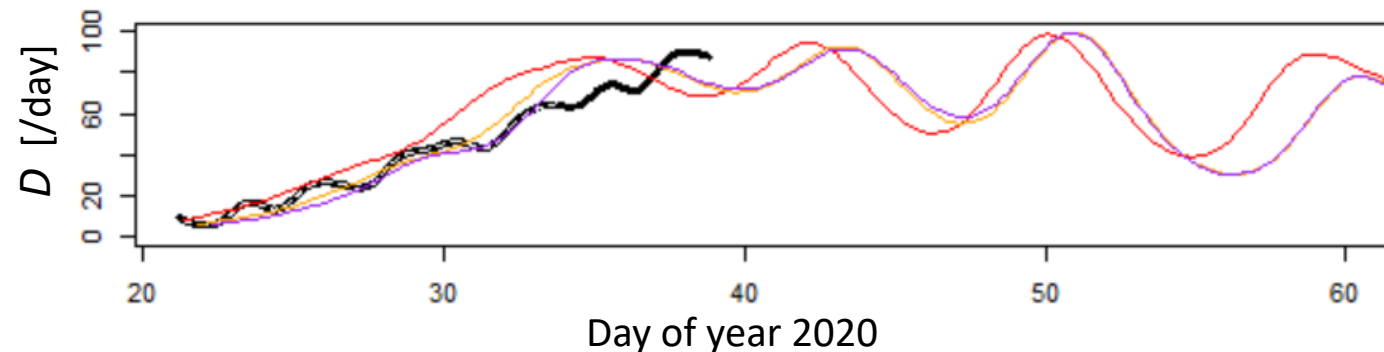
Daily number of Severe cases



- - - Observations
(part used for
modelling)

— Model (GPoM**)
(from different
initial conditions)

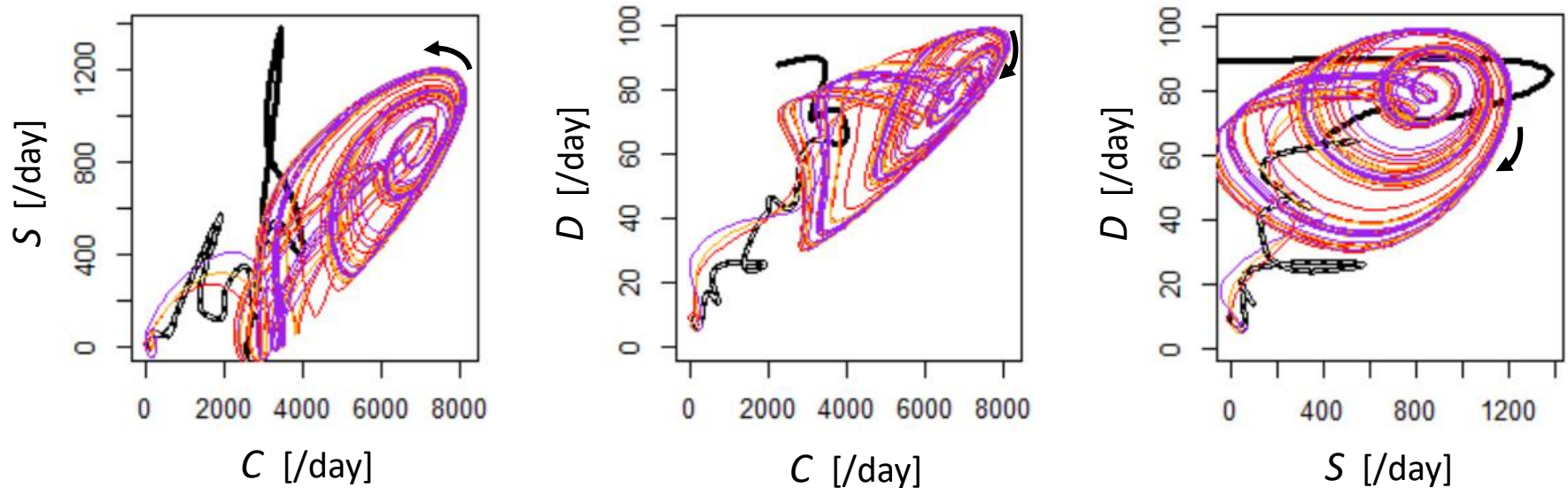
Daily number of Deaths



* Data from the official
national Chinese website
卫生应急办公室

** Model obtain with
the GPoM R package

Differential Phase portraits (coronavirus 2019-nCoV)



— Observations*
- - - Observations
(part used for
modelling)

— } Model (GPoM**)
— } (from different
— } initial conditions)

* Data from the official
national Chinese website
卫生应急办公室

** Model obtain with
the GPoM R package

Model predictions

The model was obtained with data from 21st January to 5th February (dashed lines in the graphics)

The simulations were initiated from the 21st, 22nd and 23rd of January, without online data assimilation

This model is chaotic which suggests a **strongly deterministic component** but a **high instability** (very high precision required to make long term predictions)

This model suggested that the dynamics on this period did correspond to a transient (i.e. the peak of the outbreak was still to come)

The model predicted the peak of the break out around 8-10 of February, followed by stationary conditions, that is oscillations around :

- 4000-8000 additional cases per day (average around 6000 infected cases/day)
- 0-1200 severe cases per day (extremely large oscillations, average around 600 cases/day)
- 40-100 deaths per day (average around 60 deaths/day).

At present (9th February), it seems that a peak was reached on 5-6 of February. The outbreak may (i) either have started its decrease, or (ii) have reached its stationary regime (oscillations may then start), or (iii) have just experienced an oscillation in its increasing transient. The coming days may confirm us the situation.

Last observations

At present (9th February), it seems that a peak was reached on 5-6 of February.

The outbreak may

- (i) either have started its decrease,
- or (ii) have reached its stationary regime (oscillations may then start),
- or (iii) have just experienced an oscillation in its increasing transient.

The coming days may clarify the situation.

Discussion

Positive points (at present)

- The model was able to predict that the peak would soon be reached (which was confirmed the next days)
- The model suggests very large oscillations of the number of severe cases (also confirmed the next days)
- Realistic estimations of the three variables during the transient and dynamically still coherent for the number of severe cases and deaths

Negative points (at present)

- The model was not able to predict the recent maximum number of confirmed cases (maximum was expected to reach 6000-8000 cases/day whereas it reached ~4000 only)