

The place of weather forecasting in a crisis world

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Introduction

During the recent COVID-19 outbreak there has been much to consider but more than hygiene measures and social distancing, more than the loneliness at work during the lockdown, more than the degraded mode in our functioning, our weather reports and our different productions, more than the reduction of the frequency of our work shift, I, as a regional forecaster for Météo France, have been marked by two reflections about weather forecasting: one about the real relevancy of weather forecasting in a global lockdown context and another about the resilience of forecast system during a crisis (the debate about "is COVID-19 a crisis or a simple step of a more general trend?" won't be discussed here).

The first reflection made me realize that, to put in a nutshell, most of the time, weather forecasting is an adjustment variable for the trade and the profit of our clients. Less common, a relevant help for the maintenance of activities considered as essential for the cities and non-autonomous households (energy, agribusiness or transports) and less frequently, a necessary tool for the safety of goods and even less often safety of population (for example, in my region, there are in average less than 10 events by year that could be deadly without overexposure to danger). During the lockdown, the regional forecaster shall continue to appraise the model, maintain its production and interact with local authorities: the presence of a forecaster at work has never been called into question, the weather forecaster belongs to the category of essential but invisible workers. But essential for who? The beginning of the lockdown has been remarkable by the anticyclonic condition on Western Europe without safety issues. During these first weeks, I have been preoccupied by one question: who is interested by my expertise about very reliable physics models when commercial activities are stopped and when there is absolutely no danger for a quarantined population? What is the real purpose of a weather forecast when there are no safety issues in normal circumstances? are we producing a simple adjustment variable for the benefit of our clients? Actually, the appearance of national weather services corresponds with the



Industrial Revolution (the middle of XVIII century) and then, they have grown up with the globalisation. Nevertheless, these last days, we have known one of the first concrete harmful consequence of the extreme globalization and this growth model is going to be reconsidered in various countries. So we can logically wonder what could be the future of national weather services missions in this context.

The second reflection made me wonder about what weather forecast may look like in a disturbed world. Indeed, during the apex of the sanitary crisis, we have known a slight decrease of the AMDAR measures with the decrease of air traffic. It caused a slight decrease in the quality of the initialization of weather models. Slightly...All the better! But, what would become the forecast system if maintenance operators could not maintain weather stations or more generally if the observation network broke down? In the longer term, energetic and climatic pathways suggest worse and unavoidable disturbances at larger scale. What will be the place of the weather forecasting system in a possible energetic arbitration? How national weather services will be considered? Nowadays, national weather services equip themselves with supercomputers that are more and more powerful and energy-consuming. A weather forecast supercomputer consumes energy in the order of 1 MW, the equivalent of the mechanical power of a diesel locomotive. When we improve by 2 the energetic efficiency of a supercomputer, we improve by 4 its computing capacity, so we finally increase by 2 its consumption: the well-known rebound effect! To sum up, is a more energy-efficient weather forecasting system possible and compatible with energetic and climatic objectives? Isn't it about time to investigate possibilities of a resilient and sober meteorology, using low-tech, human observation and accumulated knowledge about weather forecast techniques and theory? If we don't make this effort, any crisis could provoke a return to candlelight and human vulnerability to atmospheric phenomena.

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