

Using the ClimEx Large Ensemble for impact studies in Quebec

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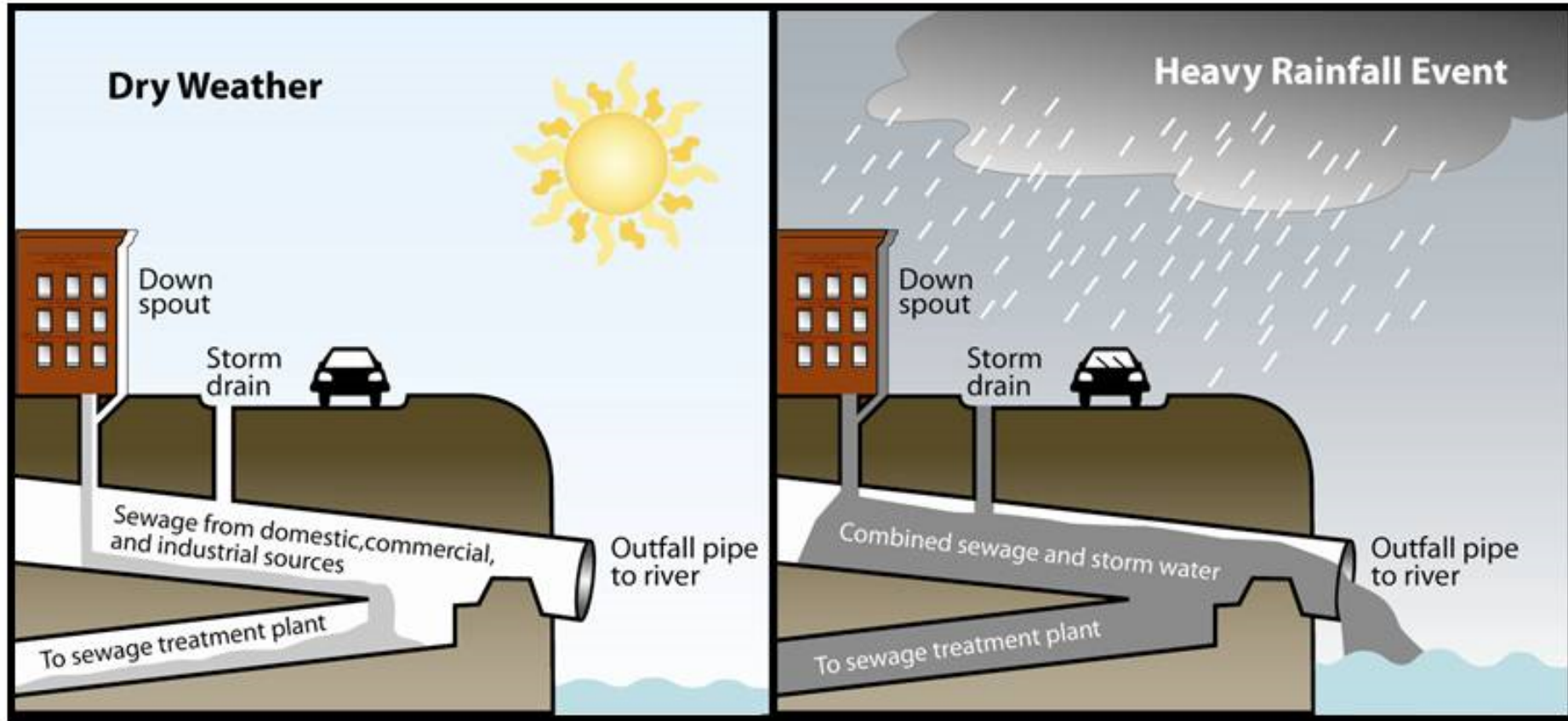
Two case studies

- Impact of climate change on the frequency of occurrence Combined Sewer Overflows (CSO)
- Impact of climate change on heat waves (study realized by Martin Leduc from Ouranos)



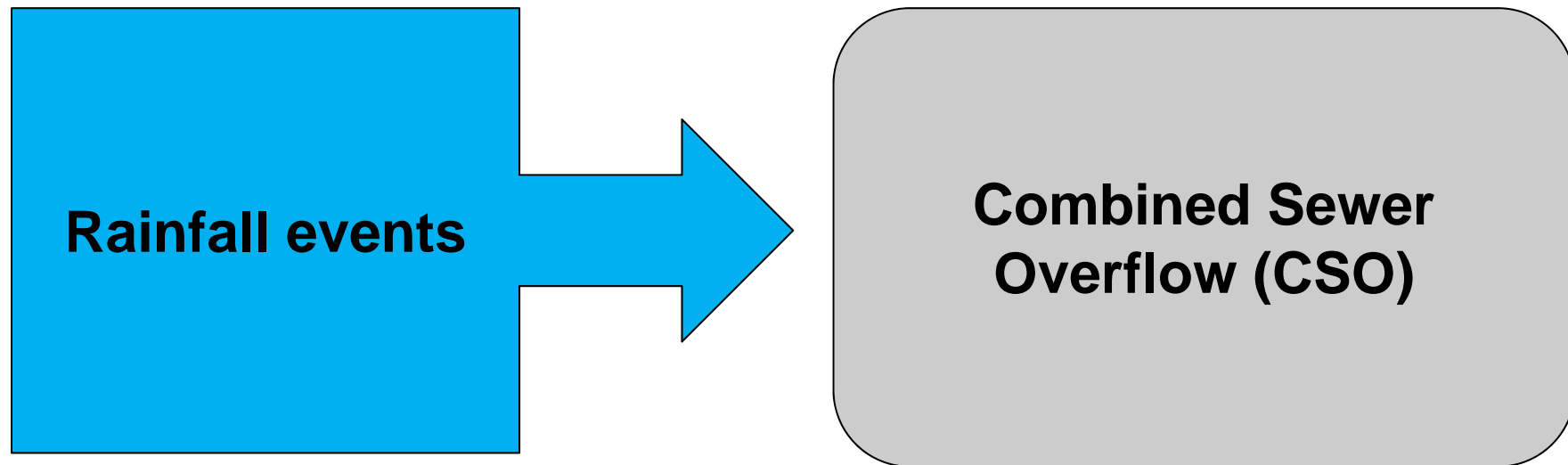
Case Study: Combined Sewer Overflow (CSO)

What are Combined Sewer Overflows?



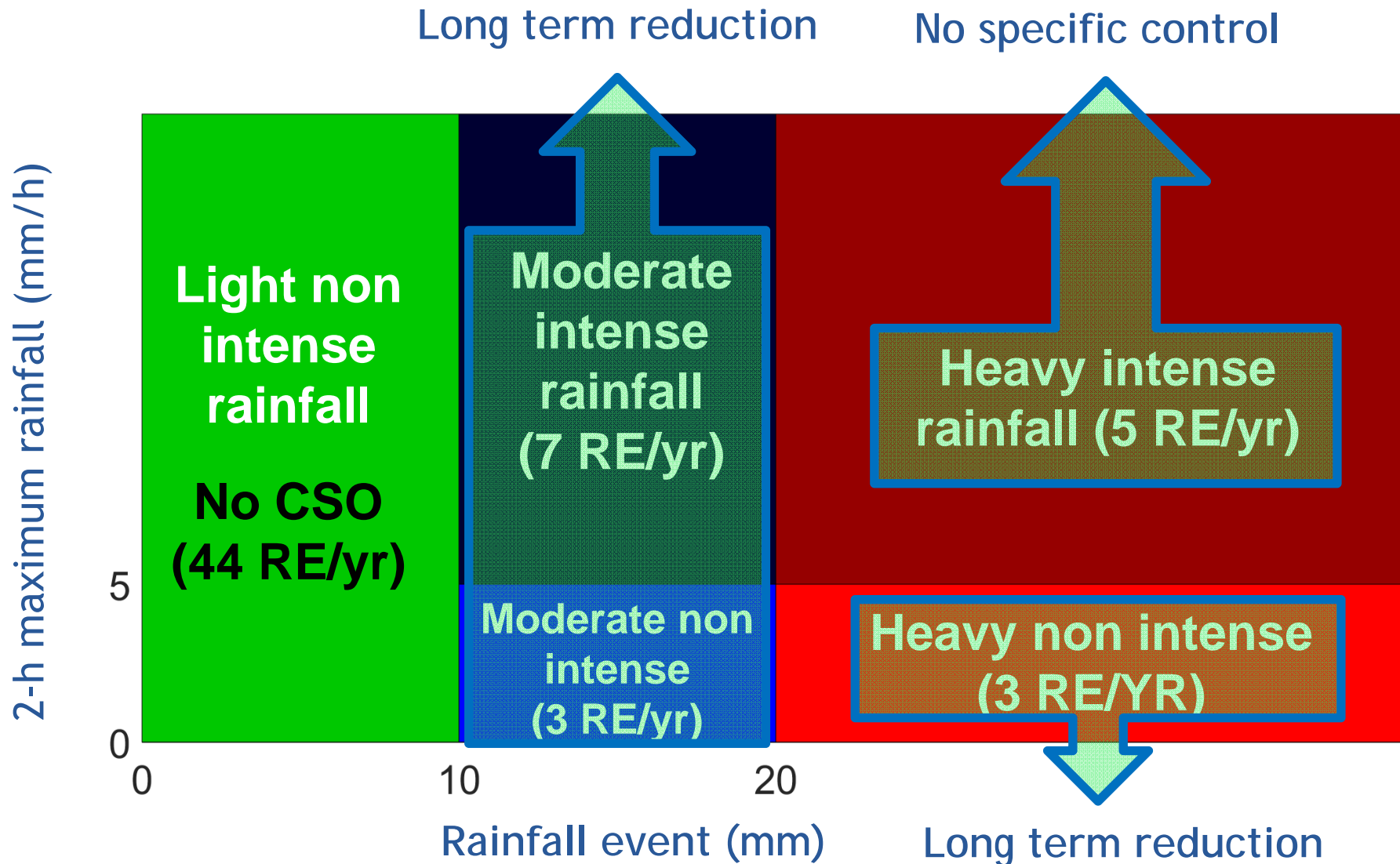
Context and objectives

- Combined Sewer Overflow (CSO) have huge impact on the quality of the receiving water
- Quebec municipalities can no longer made development that would lead to an increase of CSO frequency
- Climate change may have an impact of CSO frequency through a change in rainfall event characteristics
- Development of long term CSO reduction strategy must consider possible impact of climate change



**What rainfall events generate CSO?
Which rainfall event do we target to
reduce CSO frequency?**

Five rainfall event (RE) categories

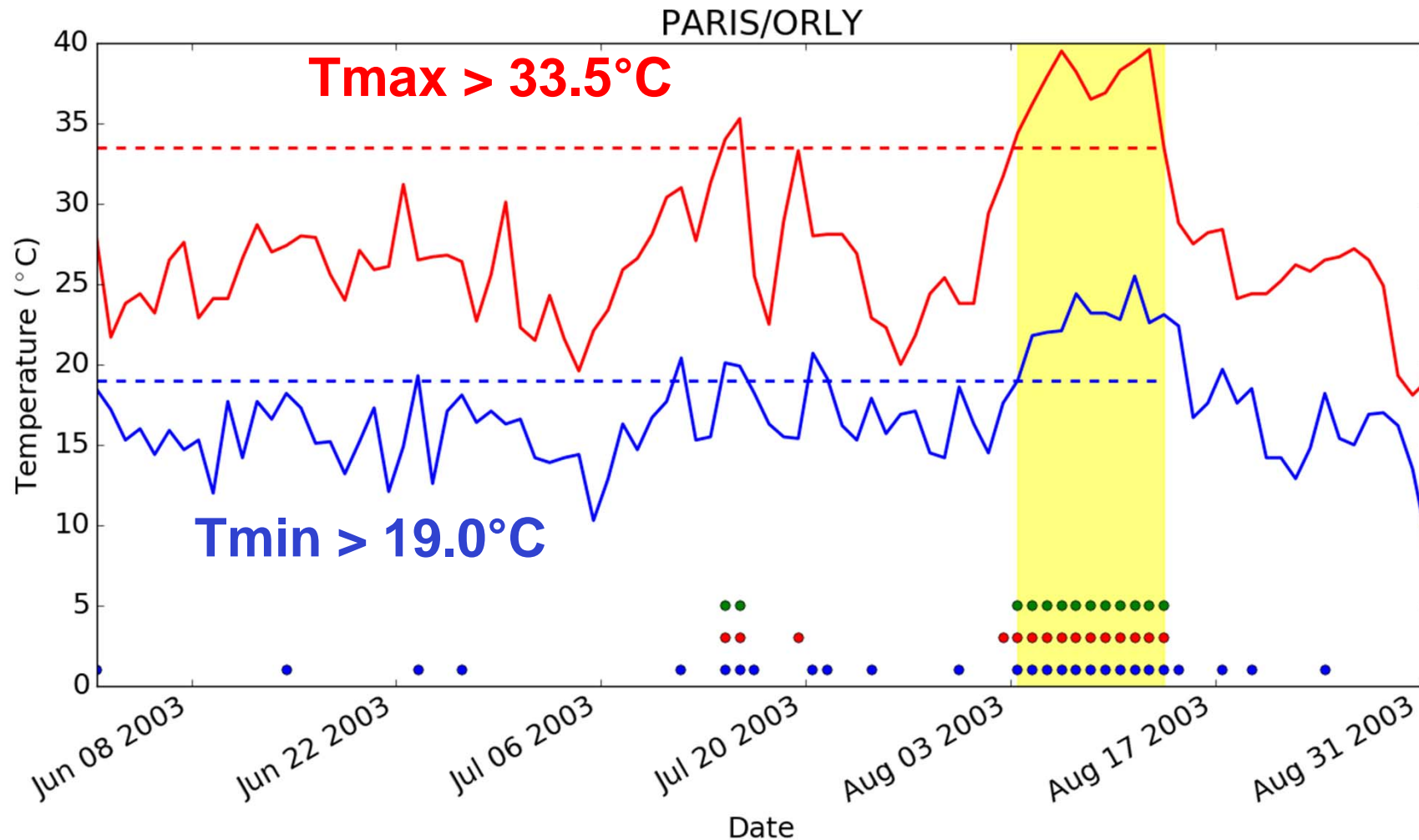


Changes in RE annual frequency

+2 RE/yr	No control
-2 RE/yr	To be reduced
-5 RE/yr	No CSO
Annual frequency	

Case Study: Heat Waves (study realized by Martin Leduc, Ouranos)

Heat waves as a major health issue: the Paris August 2003 example



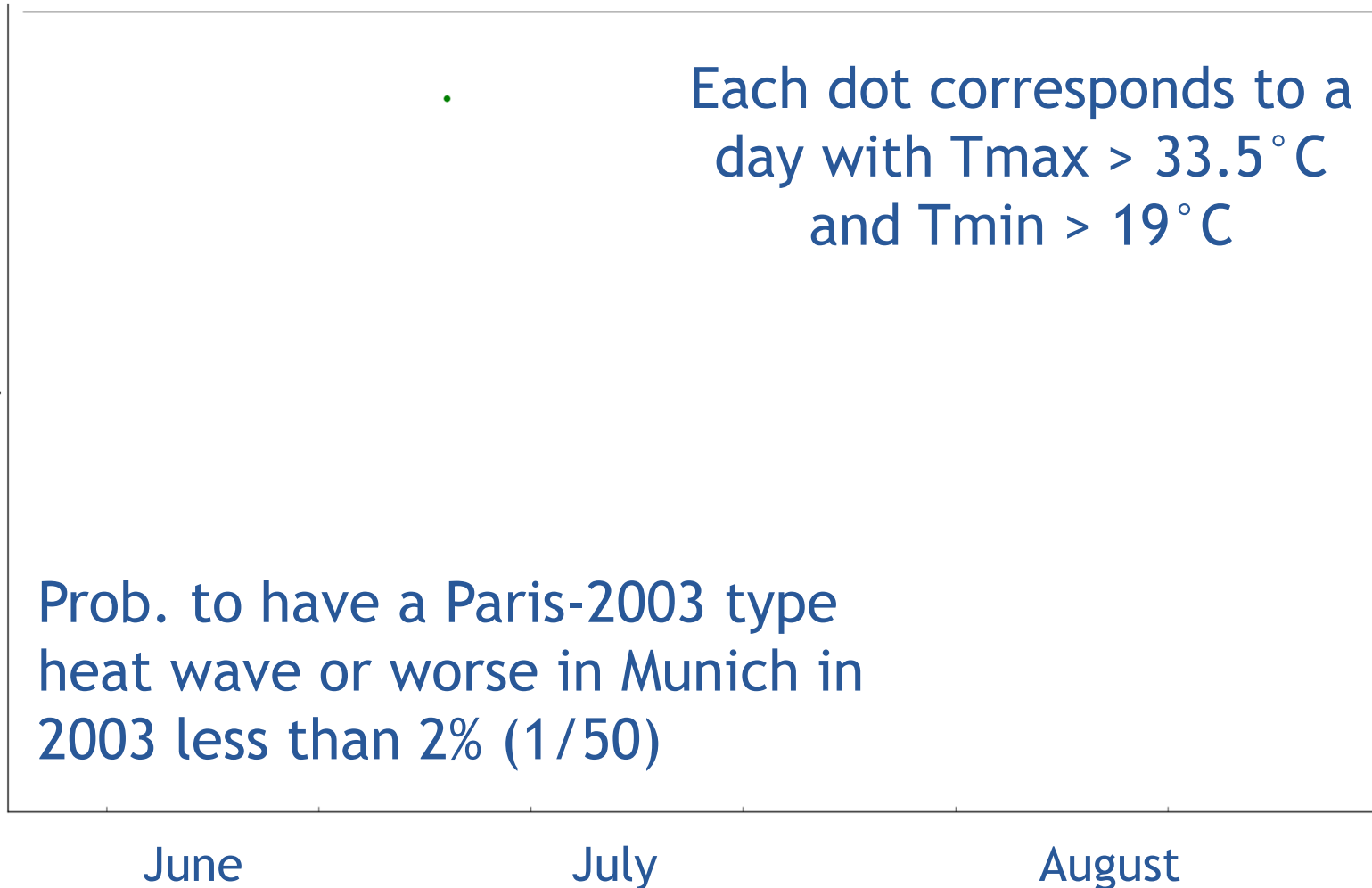
Excess mortality increased by 149% in the Paris region!!

Paris-2003 type heat waves for Munich according to ClimEx



SUMMER 2003

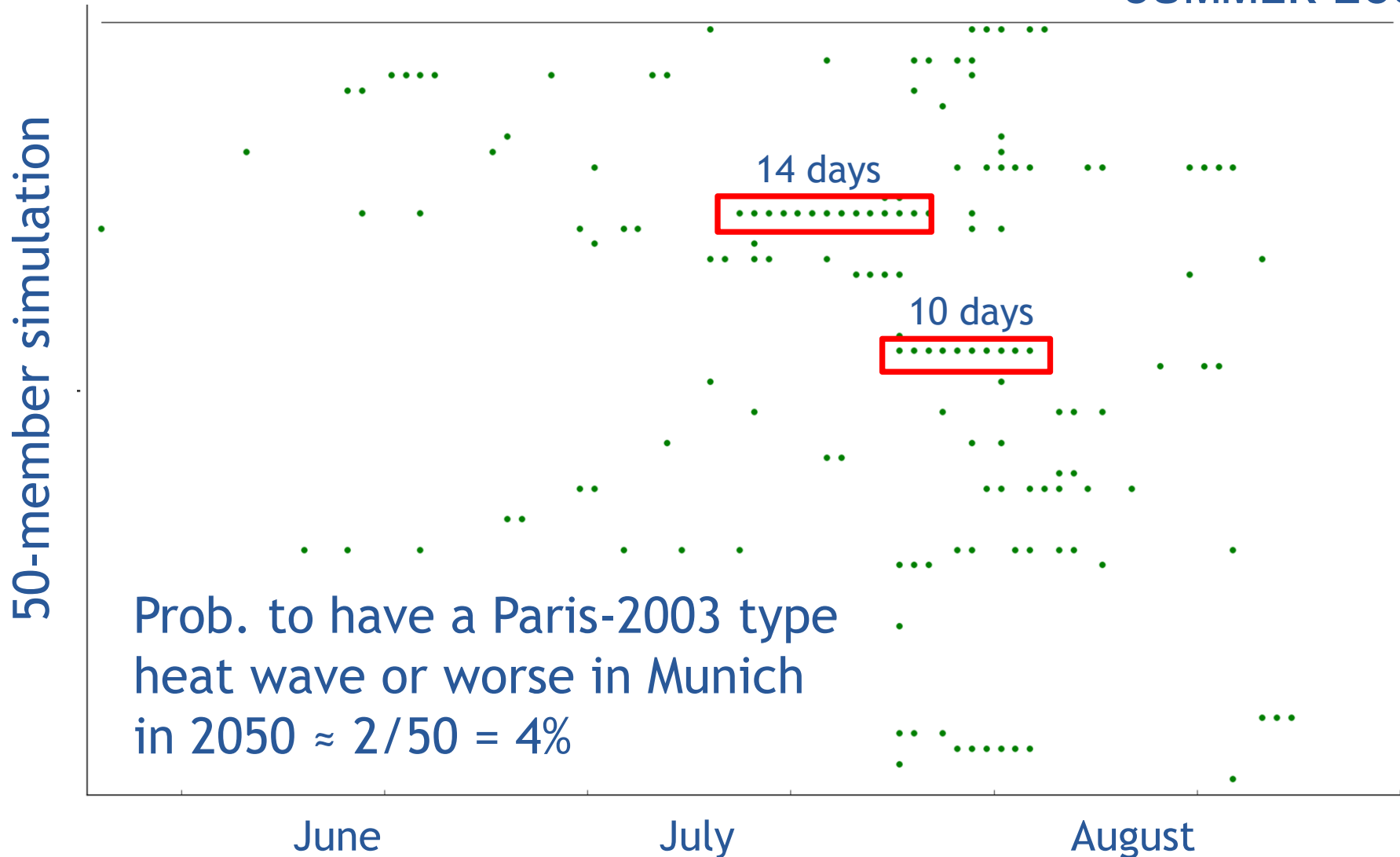
50-member simulation



Paris-2003 type heat waves for Munich according to ClimEx



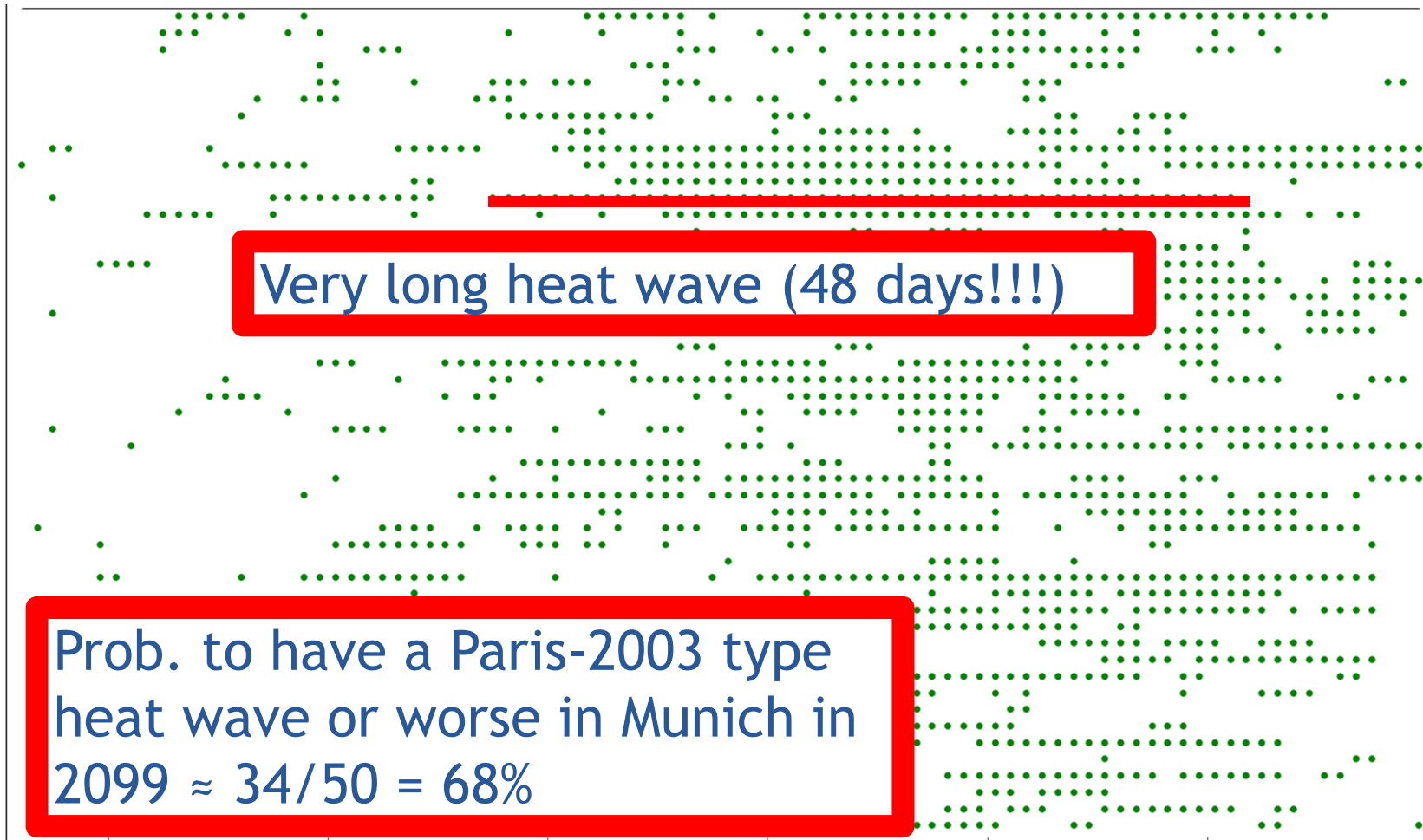
SUMMER 2050



Paris-2003 type heat waves for Munich according to ClimEx

SUMMER 2099

50-member simulation



Prob. to have a Paris-2003 type heat wave or worse in Munich in 2099 $\approx 34/50 = 68\%$

June

July

August

Key messages

CSO reduction

- Small reduction of the number of rainfall event targeted for CSO control
- Possible increase in CSO volume

Heat wave

- Probability to have Paris-2003 type heat wave in Munich increase rapidly between 2050 and 2100
- Very long heat wave possible by the end of the century
- Do not take into consideration urban heat island effect
- Huge impact in term of public health