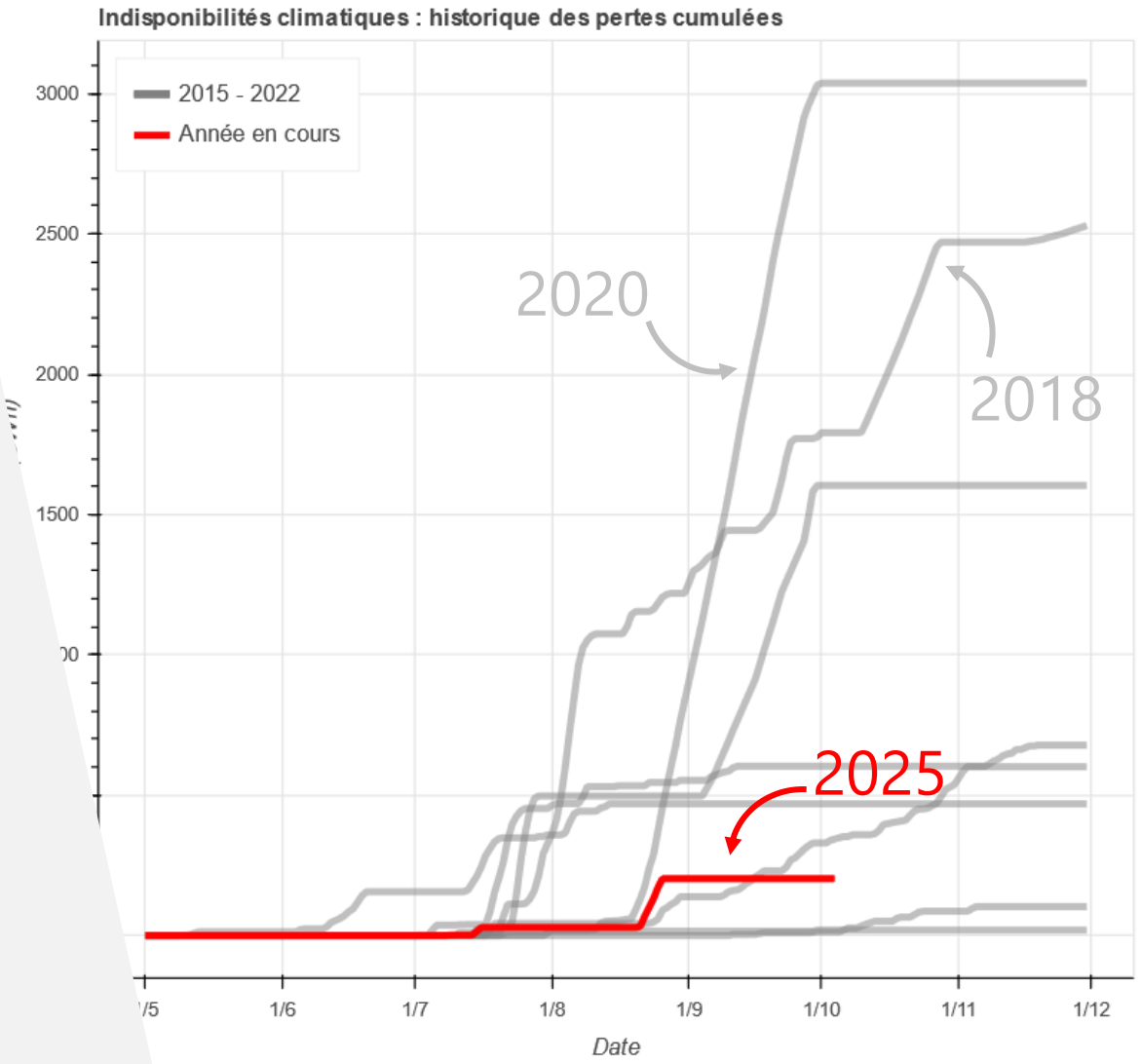
French nuclear production lost due to weather in 2023



- 220 GWh
- ~ 25M€ (at spot price)
- One the best year since 2015

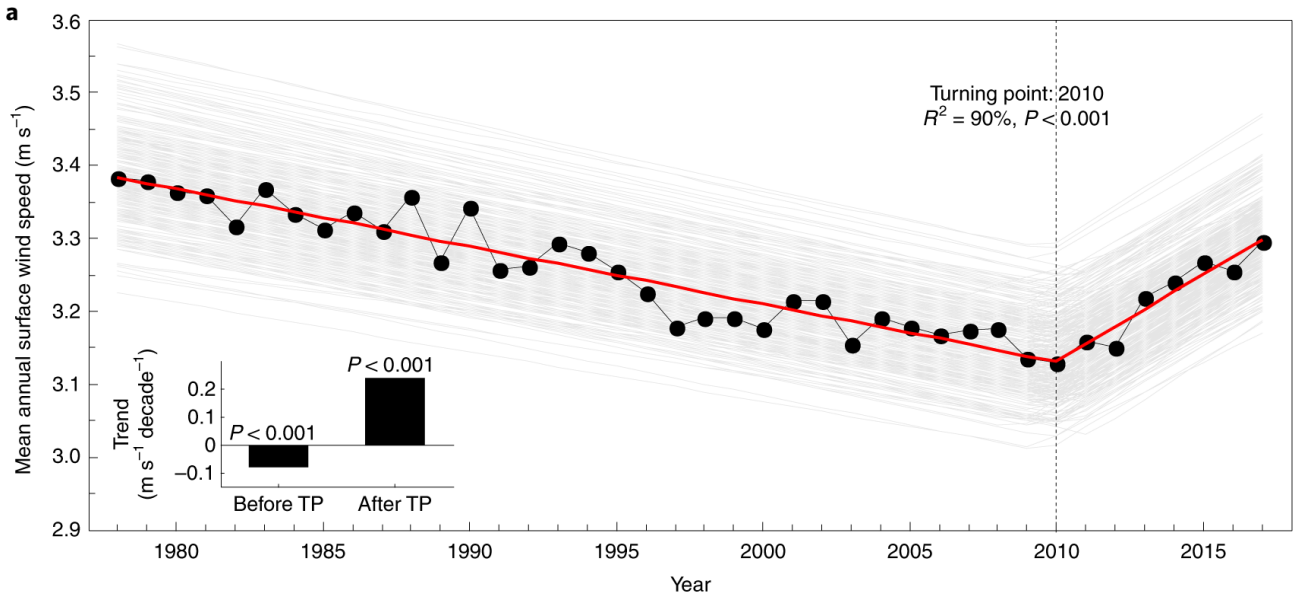
Data: nucleaire.climint.com

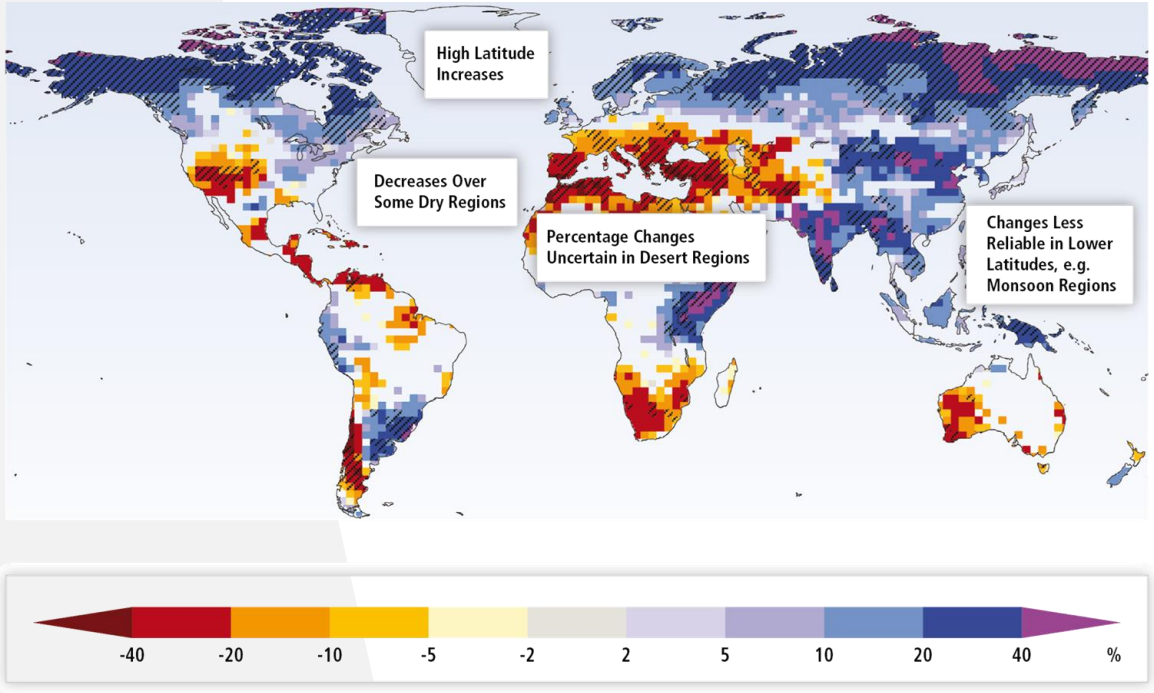
- Cruas (France) incident in 2009
  - Reactor 4 experienced a total loss of cooling.
  - Cause: Water intakes clogged due to Rhone River flooding.

- Duane Arnold (US)
  - Decommissioned prematurely in 2020.
  - Cause: Wind damage to the cooling towers.

New reactors must be
adapted or **capable to be adapted**
to climate conditions they will encounter
over their whole lifespan

- Wind speed is not stationary
- Mean winds are projected to decrease by 2050 over much of Europe, Asia and North America (IPCC AR6)





- Runoff water availability is expected to undergo significant changes
- Local evolution influenced by rain patterns, evaporation, glacier melting, water usage…

- Oroville dam (US)
  - Severely damaged by floods in 2017
  - Reparation cost amounted to $1.1 billion

- Honghaiwan (China) - typhoon Usagi (2013)
  - 8 towers collapsed
  - 11 additional turbines sustained blade damage

Climate risks impact
the entire energy system.
The ongoing transition will be
our only chance for adaptation
given the long lifespan of installations.