



**FRISCO**  
Managing fire-induced risks  
of water quality contamination

# Assessing and predicting the impacts of wildfires on water quality in Portugal



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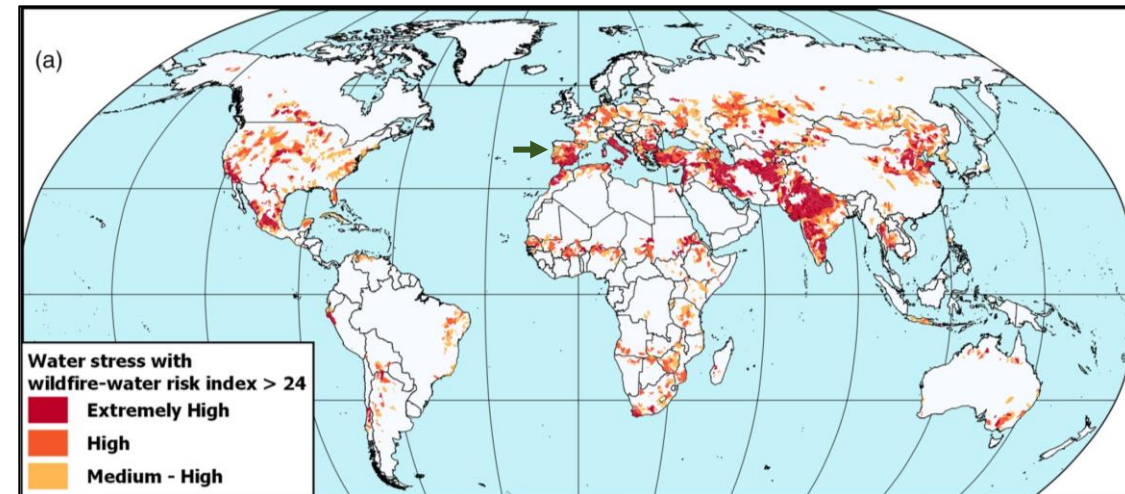
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## Fires and water quality

- An important part of global water resources is taken from fire-prone watersheds
- Ashes and sediments might contaminate downstream water resources
- Project FRISCO: quantify risks and assess mitigation measures in Portugal

“Scientists' warning on extreme wildfire risks to water supply”

Robinne et al., 2021: <https://doi.org/10.1002/hyp.14086>



Water-stressed watersheds with wildfire risk



Fire impact  
assessment methods



Relating fires with water  
quality impacts



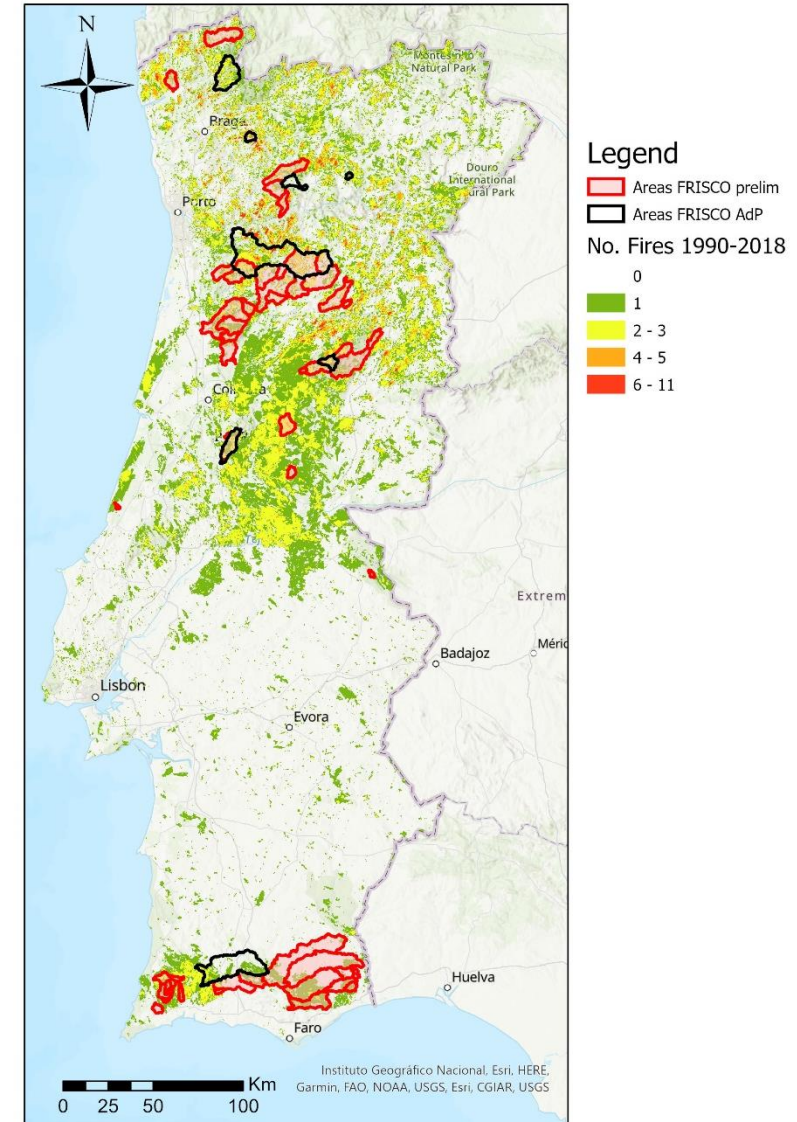
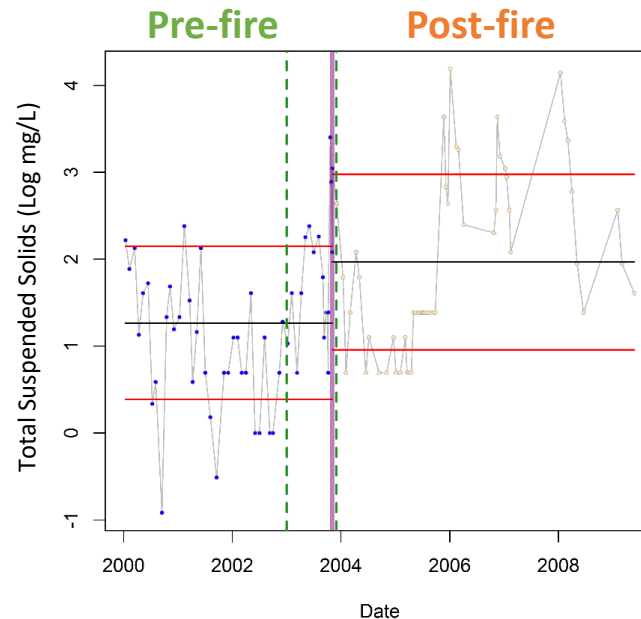
- Online tool to assess risk of fire impacts
- Manual with best management practices



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# Detecting post-fire contamination

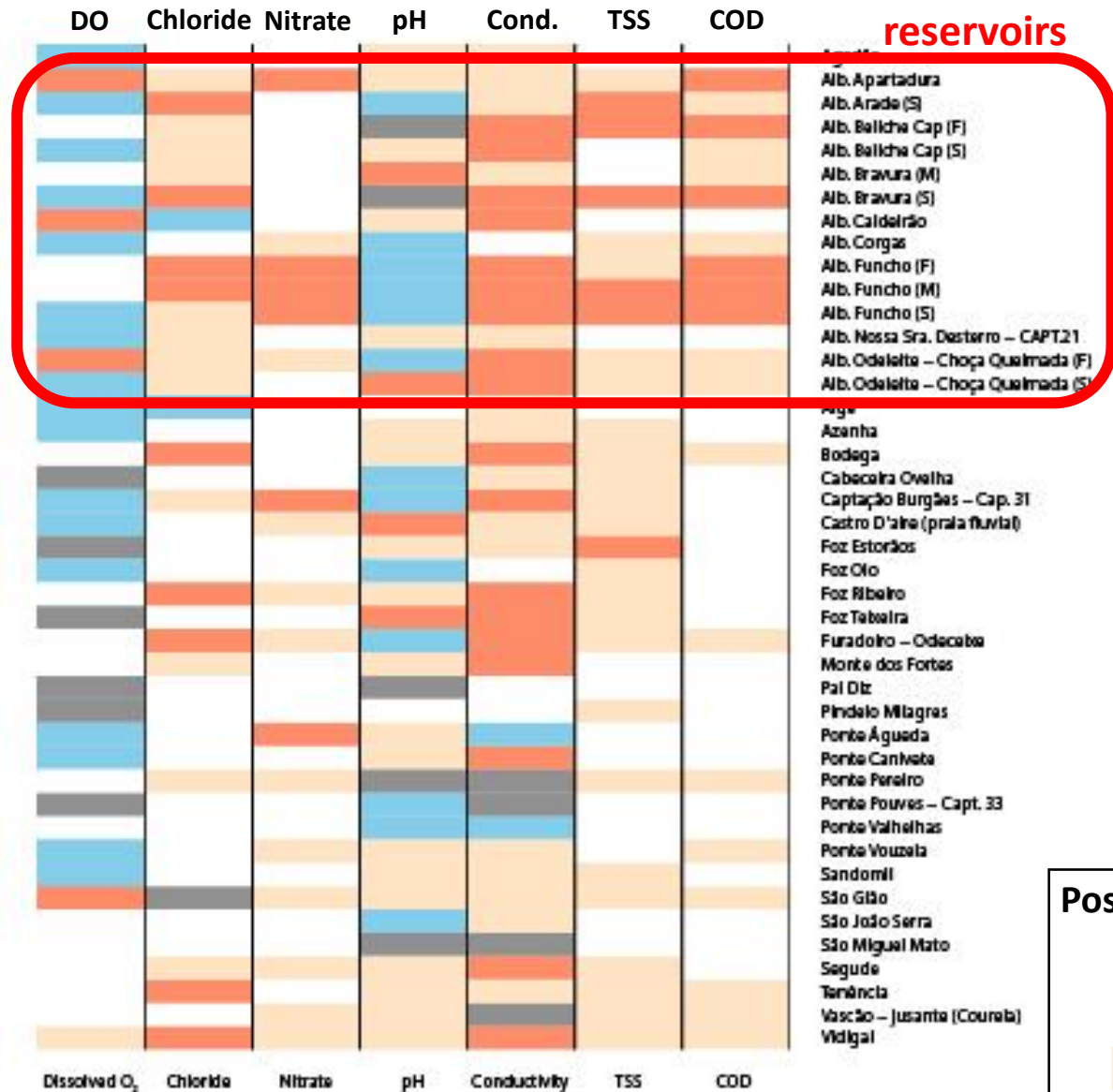
- Portuguese water quality database: 2000-2020
- 15 reservoir and 28 river locations with:
  - Limited upstream modifications (e.g. no dams)
  - Fires >100ha in the last 20 years
  - At least 4 data years before and after fire
- Change-point analysis to detect fire impacts
  - Changes to statistical properties of water quality variables





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# Change-point analysis 2000-2020



- Fire impacts on most stations
  - **Significant decrease:** DO, pH
  - **Significant increase:** Conductivity
  - **Inconclusive:** Chloride
- Reservoir stations
  - **Significant increase:** Nitrates, Sediments, COD
- Do fires only impact reservoirs?

Post-fire change:

Decrease

Increase

No change

Inconclusive

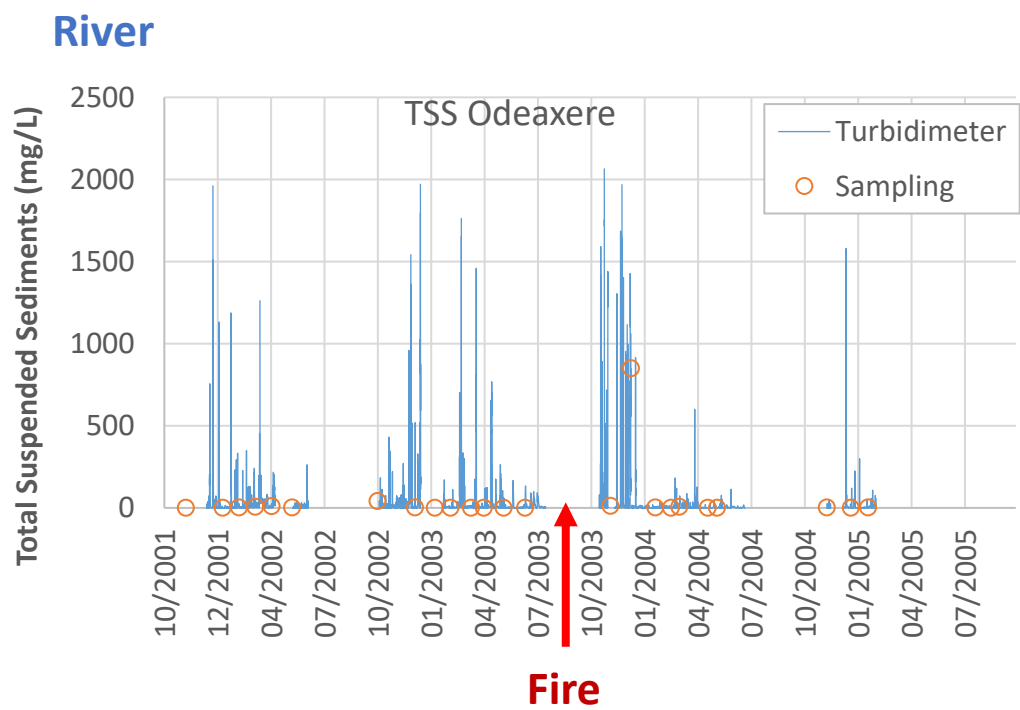
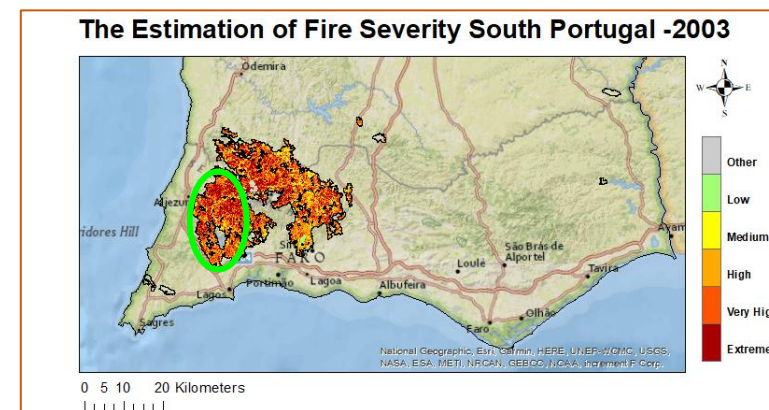
Post-fire Water quality changes, 2000-2020,  
with change-point detection



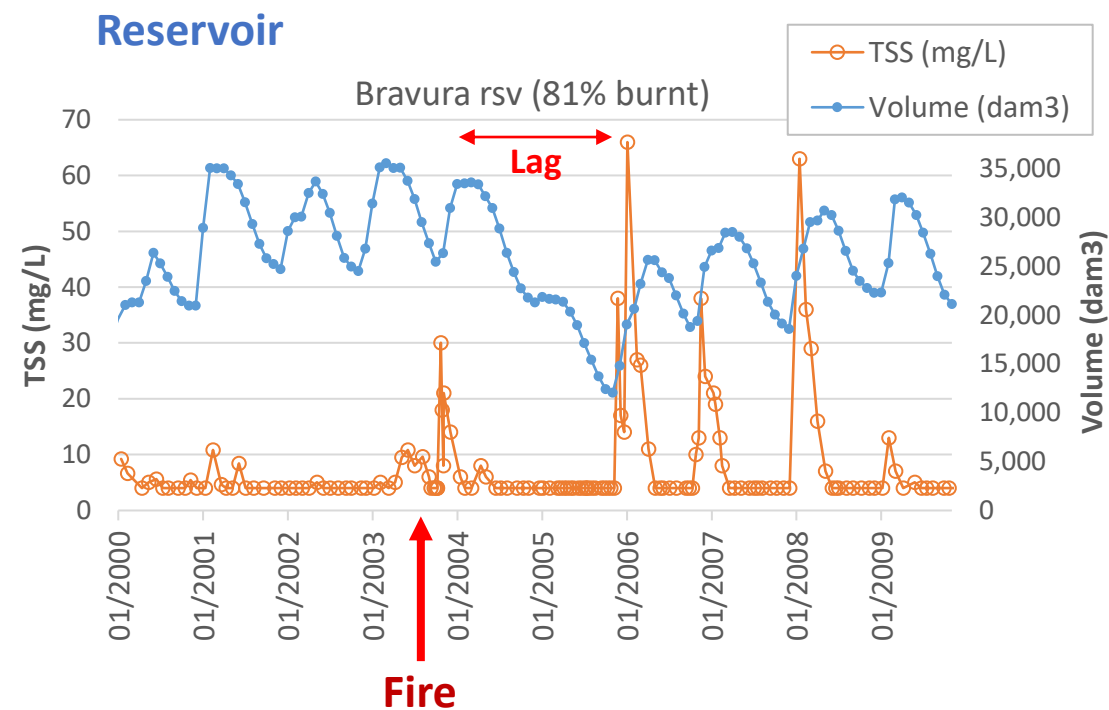
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## Focusing on one river+reservoir

- Monthly samples capture impacts in reservoirs better than in rivers
- Impacts in reservoirs extend over several years  
Ongoing work: find explanatory variables



Downstream





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**For more information:**

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See also:

SSS 9.8: Nitzsche et al.  
Wednesday morning



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