Flood impacts in the commercial sector: insights from field surveys in Belgium

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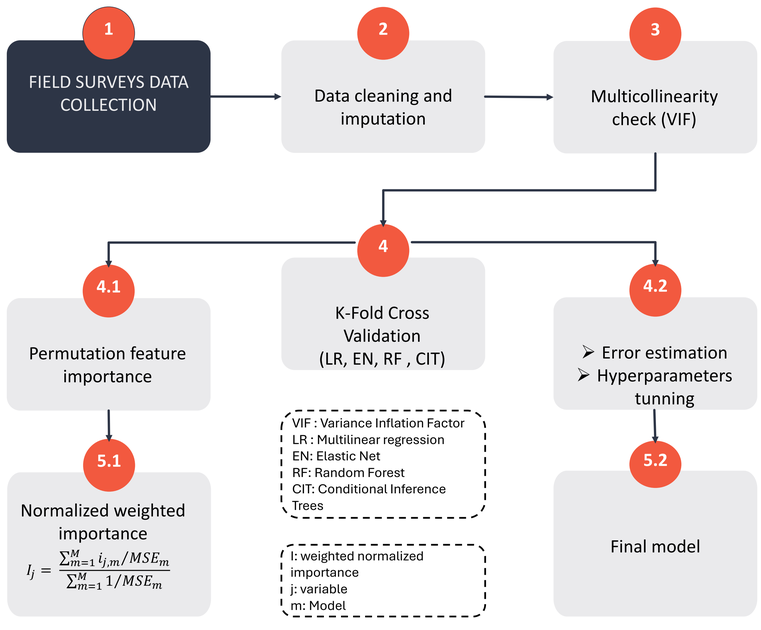
BACKGROUND AND MOTIVATION

- Impact in the commercial sector is less explored than the residential sector. [1]
- The commercial sector represented 25% of losses in Wallonia in the 2021 flood.
- There is limited high quality data on flood business direct and indirect impacts. [1]

OBJECTIVES:

- Explore relations between explanatory variables for damage.
- Determine the most important features for total direct damage and business downtime.

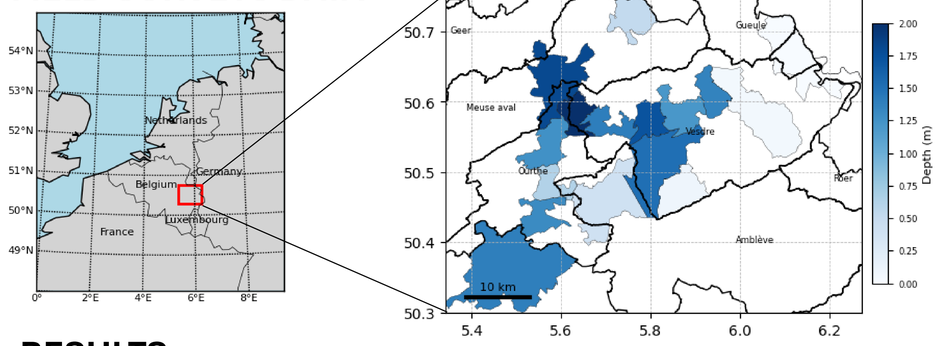
METHODS



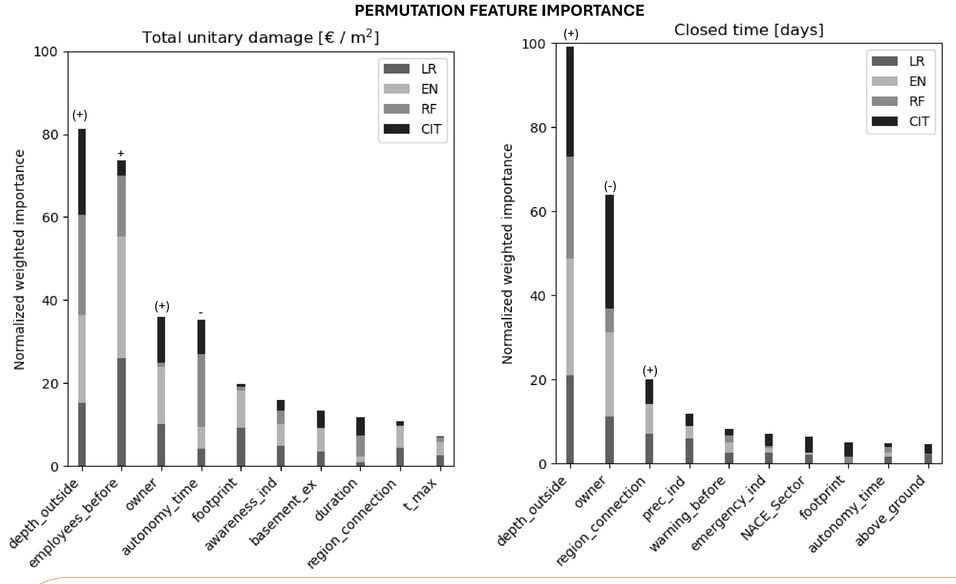
REFERENCES

[1]Devadas, B. *et al.* (2025) 'Projecting future flood losses to company assets in Europe: The role of precautionary measures', *Earth's Future*, 13(11). doi:10.1029/2025ef006285.

FIELD SURVEYS DATA



RESULTS

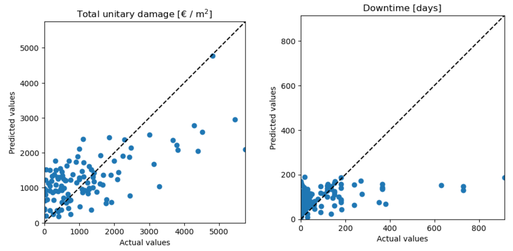


- 134 Surveys collected mostly in the Vesdre (700 km^2) and Ourthe (3500 km^2) catchment in Belgium. Among the most affected municipalities.
- Variables hazard, vulnerability, warning and precautionary measures were asked. Sixteen explanatory variables used in the model.
- Median water depth was 1.5 m
- Maximum direct damage (~$8 * 10^6$€) was one order of magnitude higher than in the residential sector

CROSS-VALIDATION ERROR

	Total unitary damage [€/m^2]		Downtime [days]	
model	mse	mae	mse	mae
LR	1.1E+06	859	1.4E+04	88
EN	1.0E+06	805	1.0E+04	78
RF	1.2E+06	812	1.2E+04	88
CIT	1.4E+06	897	1.1E+04	85

PREDICTIONS (EN)



() : significance p < 0.05

KEY MESSAGES AND OUTLOOK

- Water depth is the primary predictor of both total direct damage and downtime, showing a strong and statistically significant positive correlation.
- Ownership status significantly influences impacts: while it is positively associated with direct damage, owners tend to recover faster than tenants, indicating greater vulnerability among tenants in post-flood recovery.
- Data-driven models are highly sensitive to dataset characteristics; the limited sample size increases susceptibility to outliers and elevates model error. Expanding the dataset (e.g., incorporating data from other countries) would improve robustness and applicability.

Your feedback is welcome !

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