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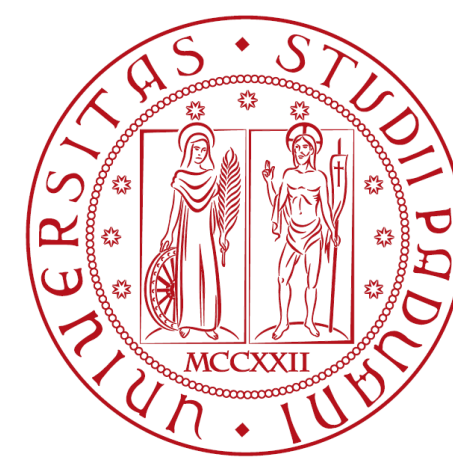
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The effectiveness of channel control works: how multi-temporal sediment dynamics analysis could support watershed management

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WHY ?

Background

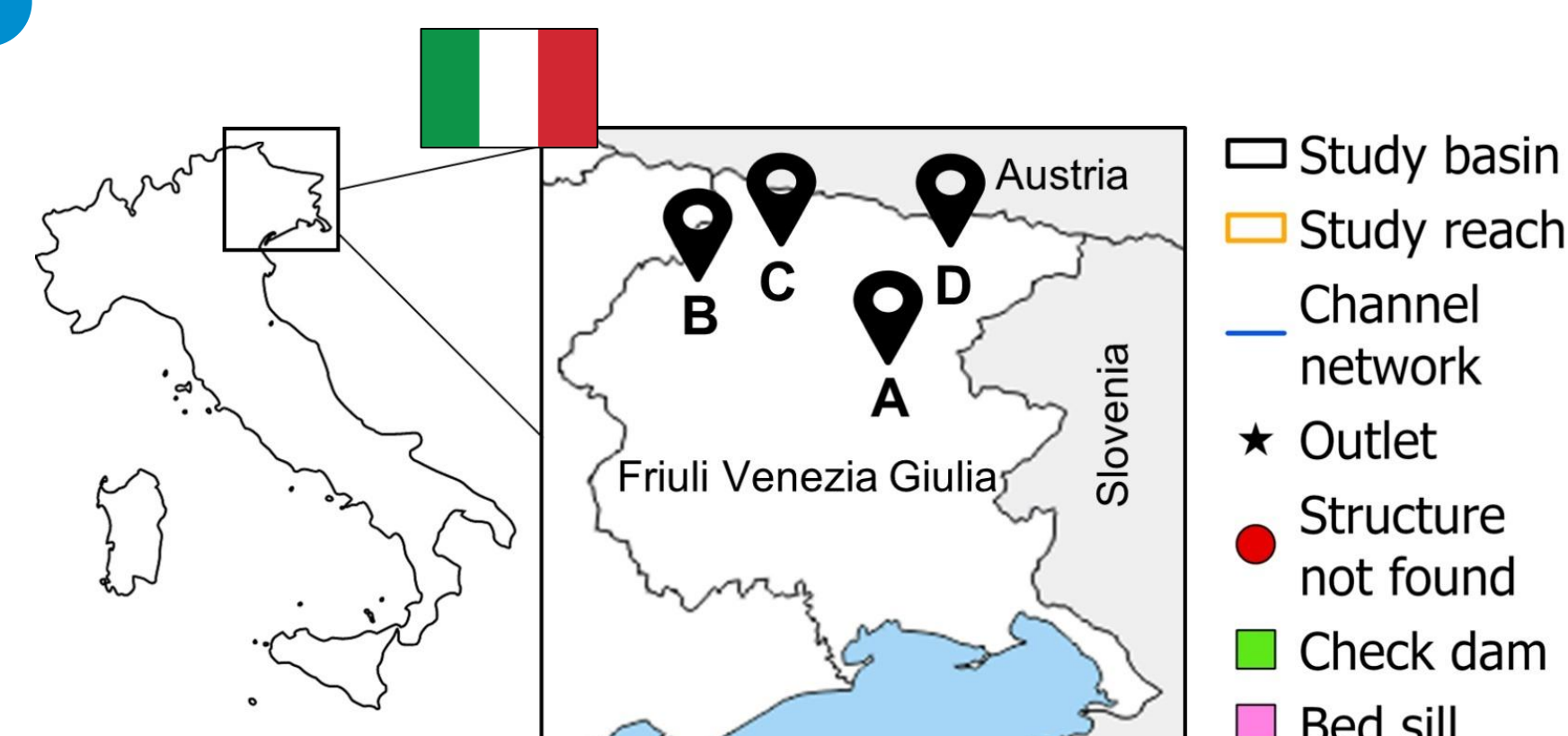
Lack of information on the **status and functionality of existing structures**, and a priori in-depth study to analyse **the sediment morphology dynamics and the interaction with existing channel control works**

Aim of the research

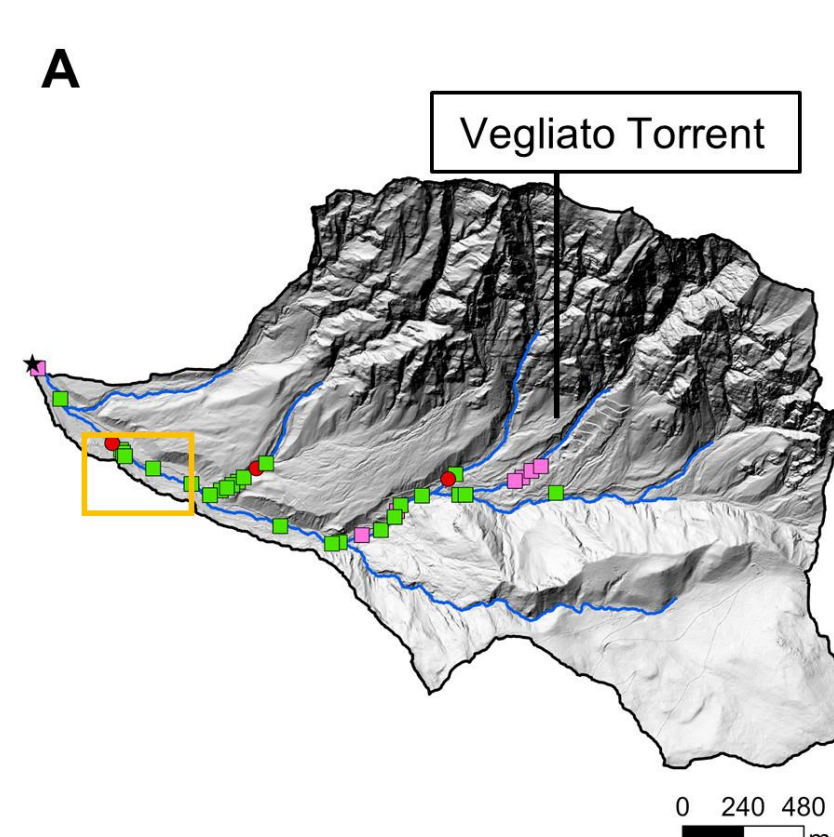
To introduce a methodological approach that integrates **sediment morphology dynamics data** over extended time spans in some mountain catchments **with the current status and functionality of existing interventions**

WHERE ?

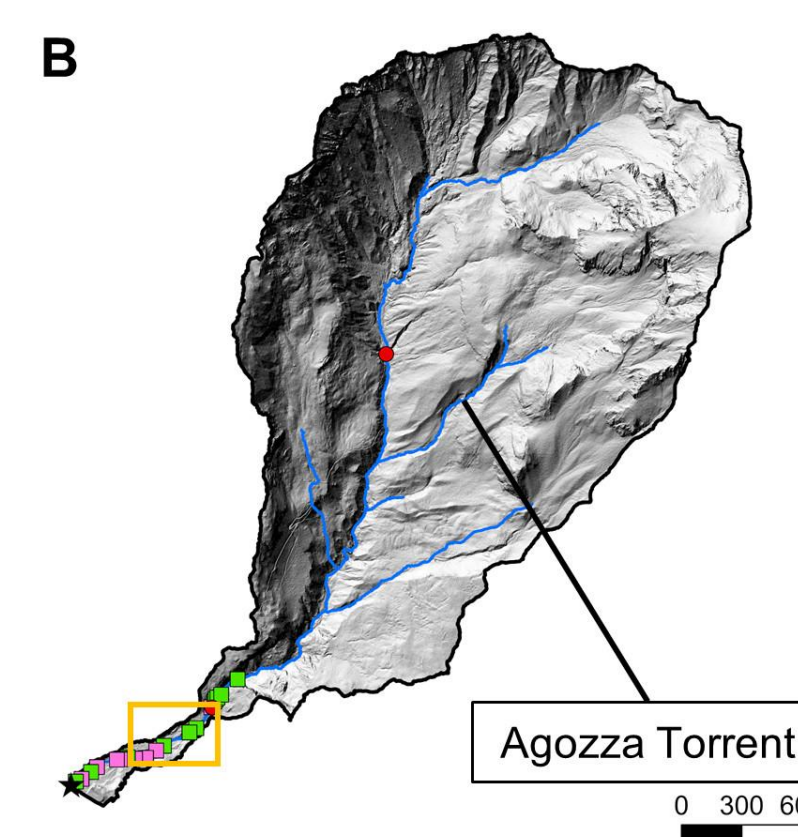
4 mountain basins



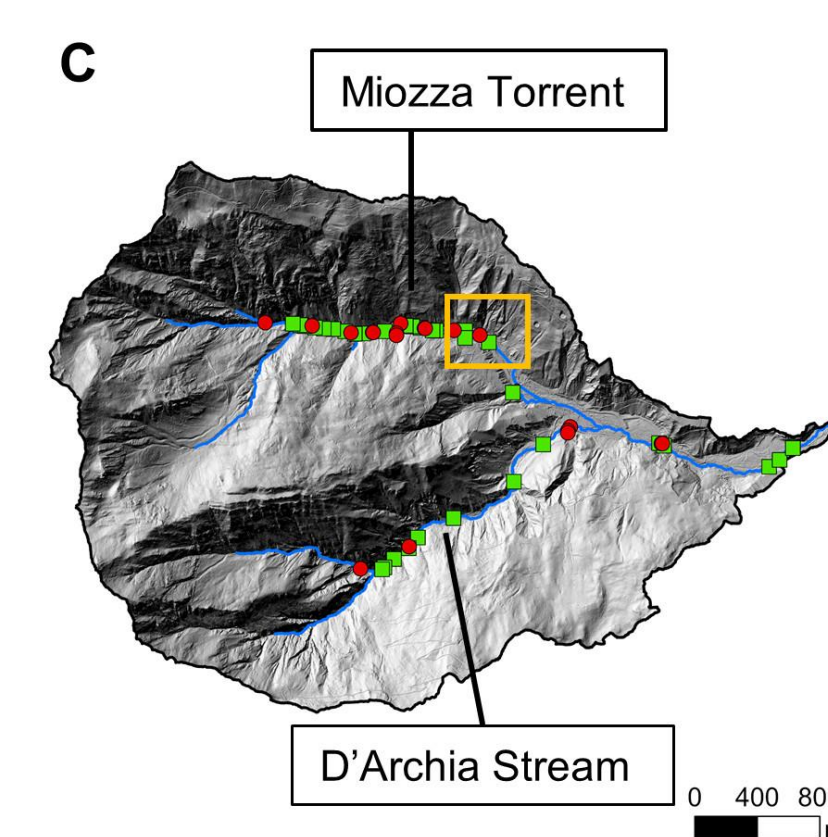
Vegliato torrent



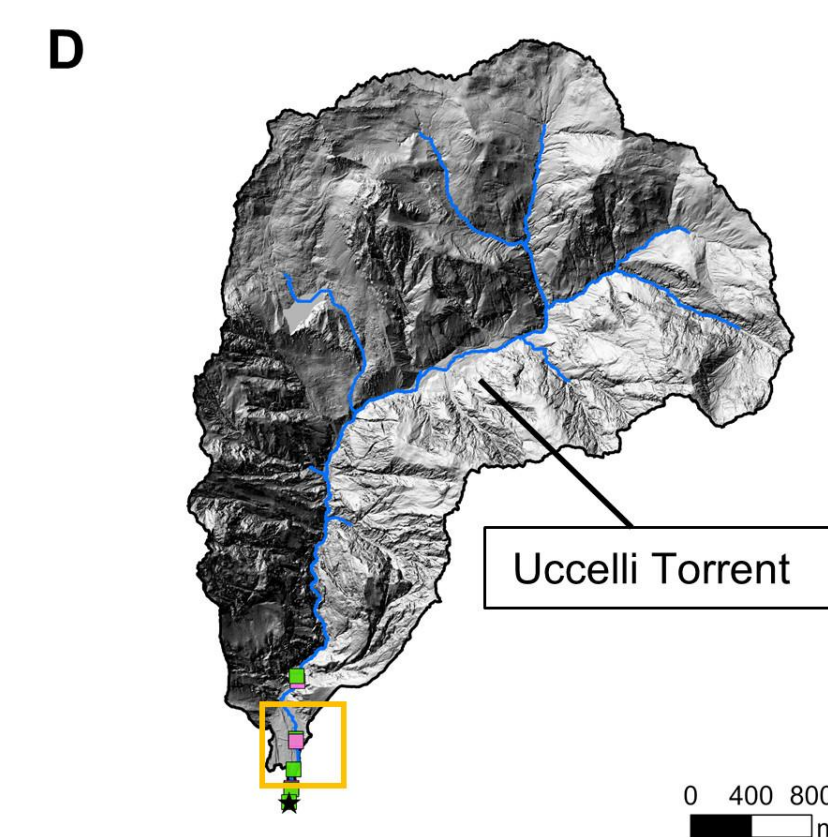
Agozza torrent



Miozza torrent



Uccelli torrent



HOW ?

Methodological workflow

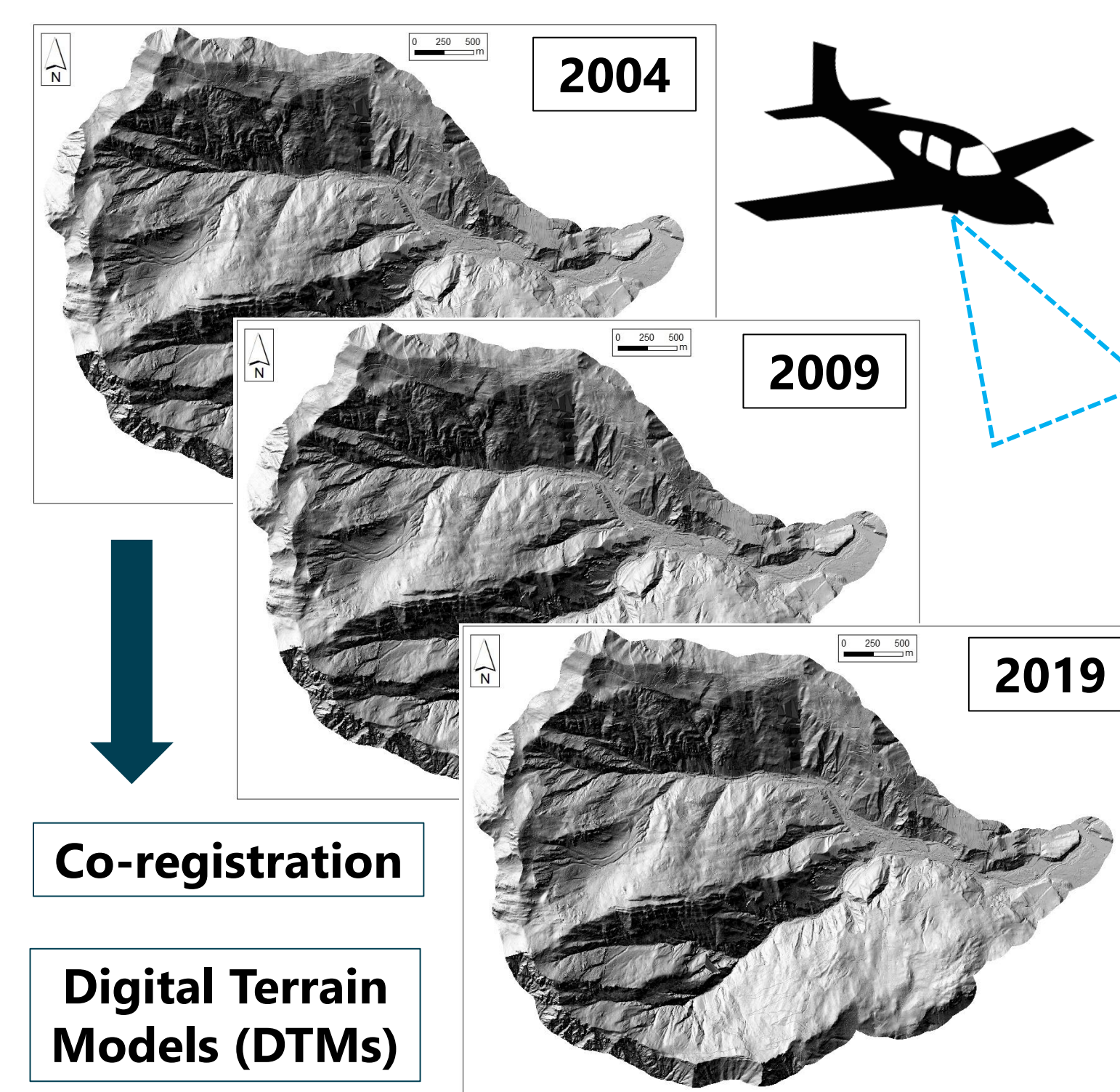
Updating of channel control work database

Type, location and measures of structures

Status and functionality of structures

Multi-temporal topographic surveys

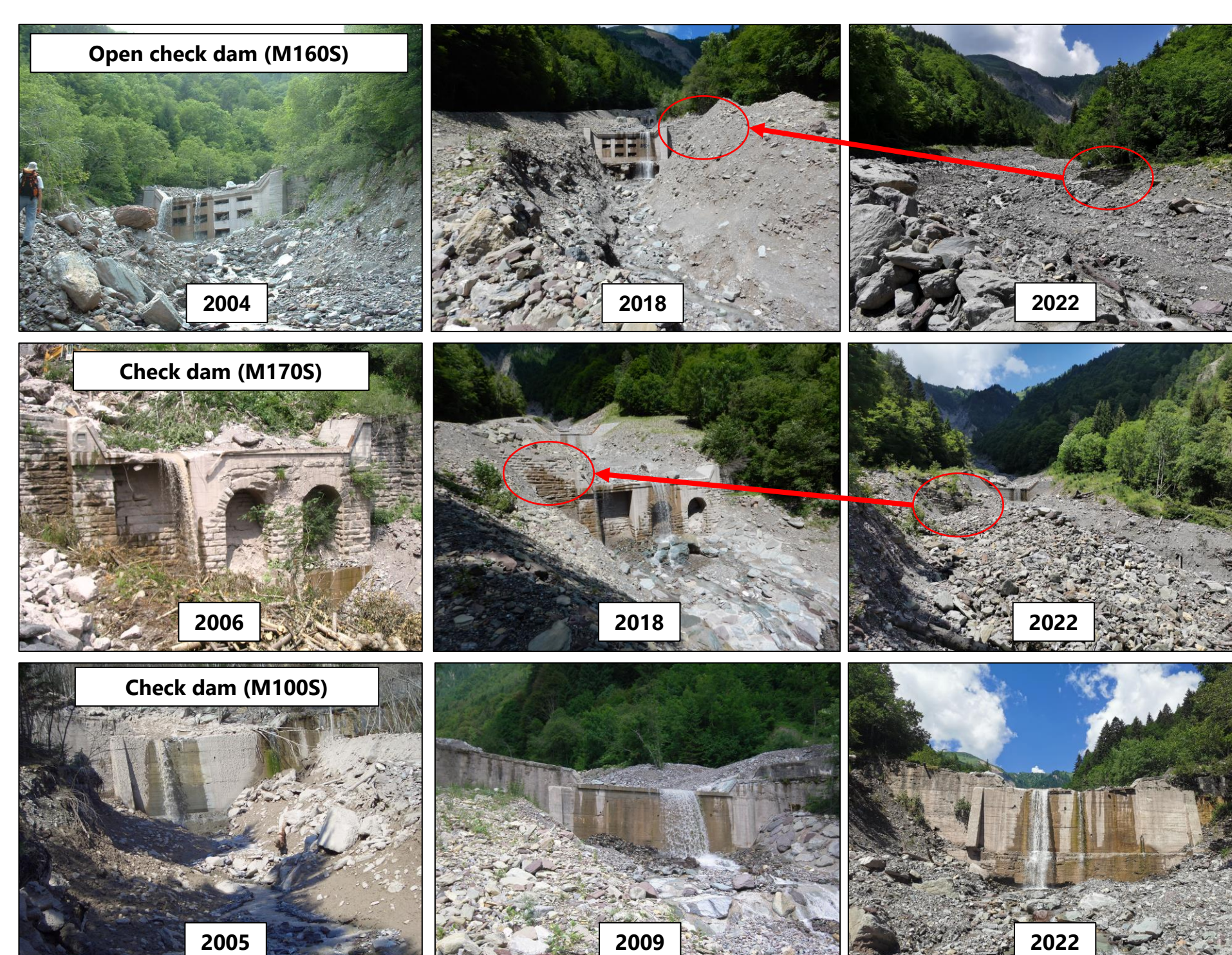
Airborne Laser Scanning (ALS)



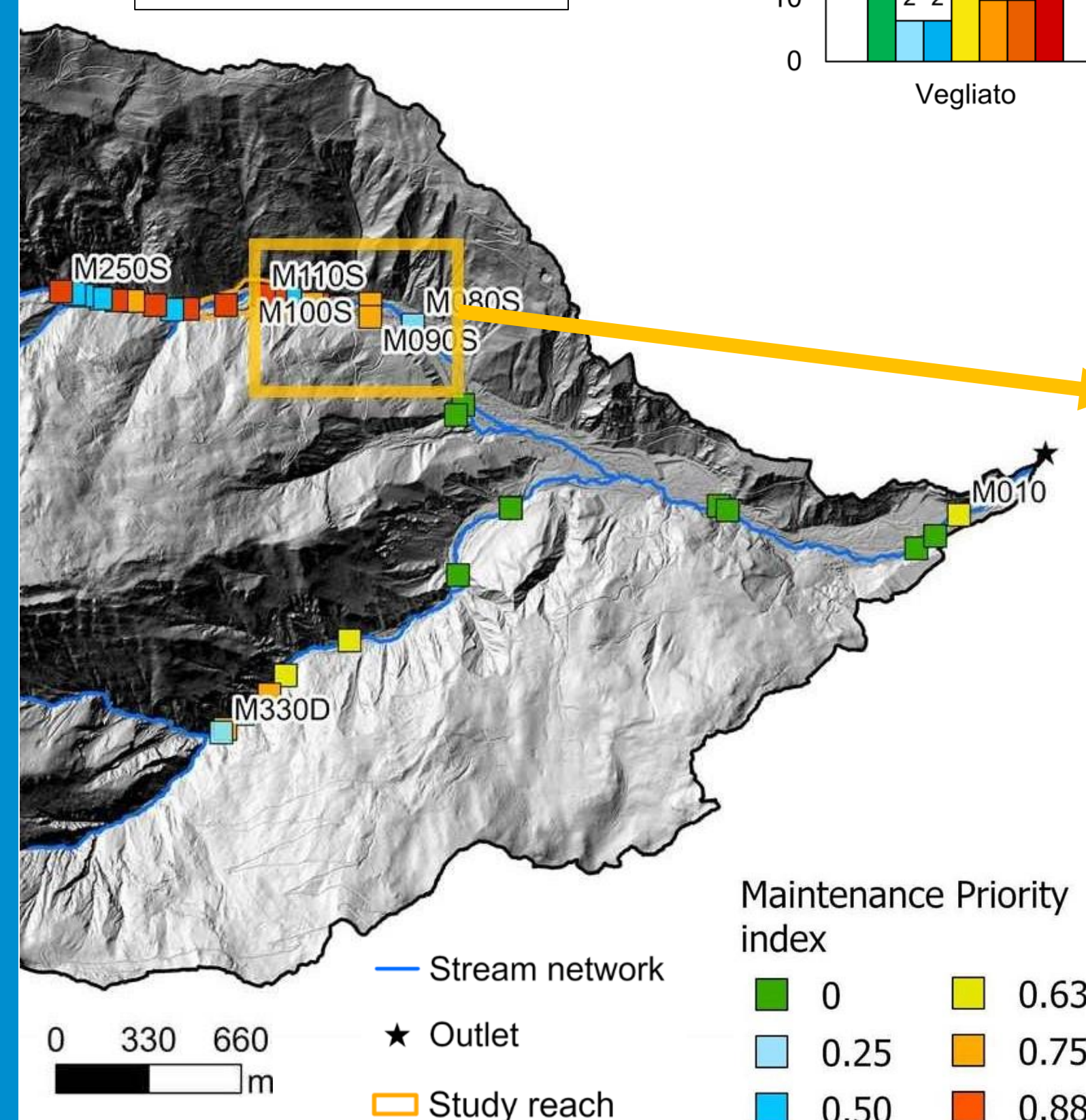
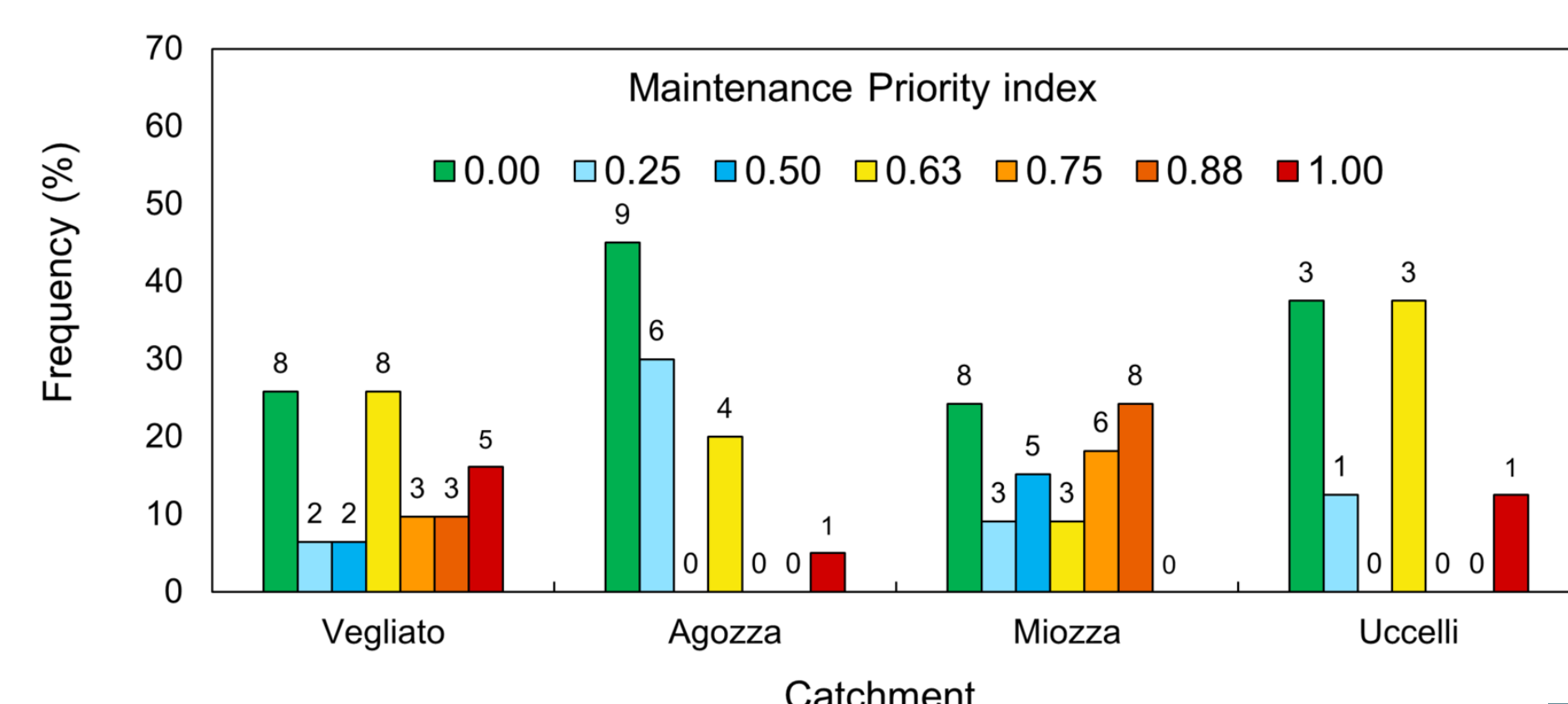
Maintenance Priority index (MPi)
for each channel control work

Functionality	Score	Status		
		Destroyed	Damaged	Good
Low	0	1	0.88	0.50
Medium	0.5	1	0.75	0.25
High	1	1	0.63	0

$$MPi = 1 - \left(Score_{status} \times \left(\frac{Score_{status} + Score_{functionality}}{2} \right) \right)$$

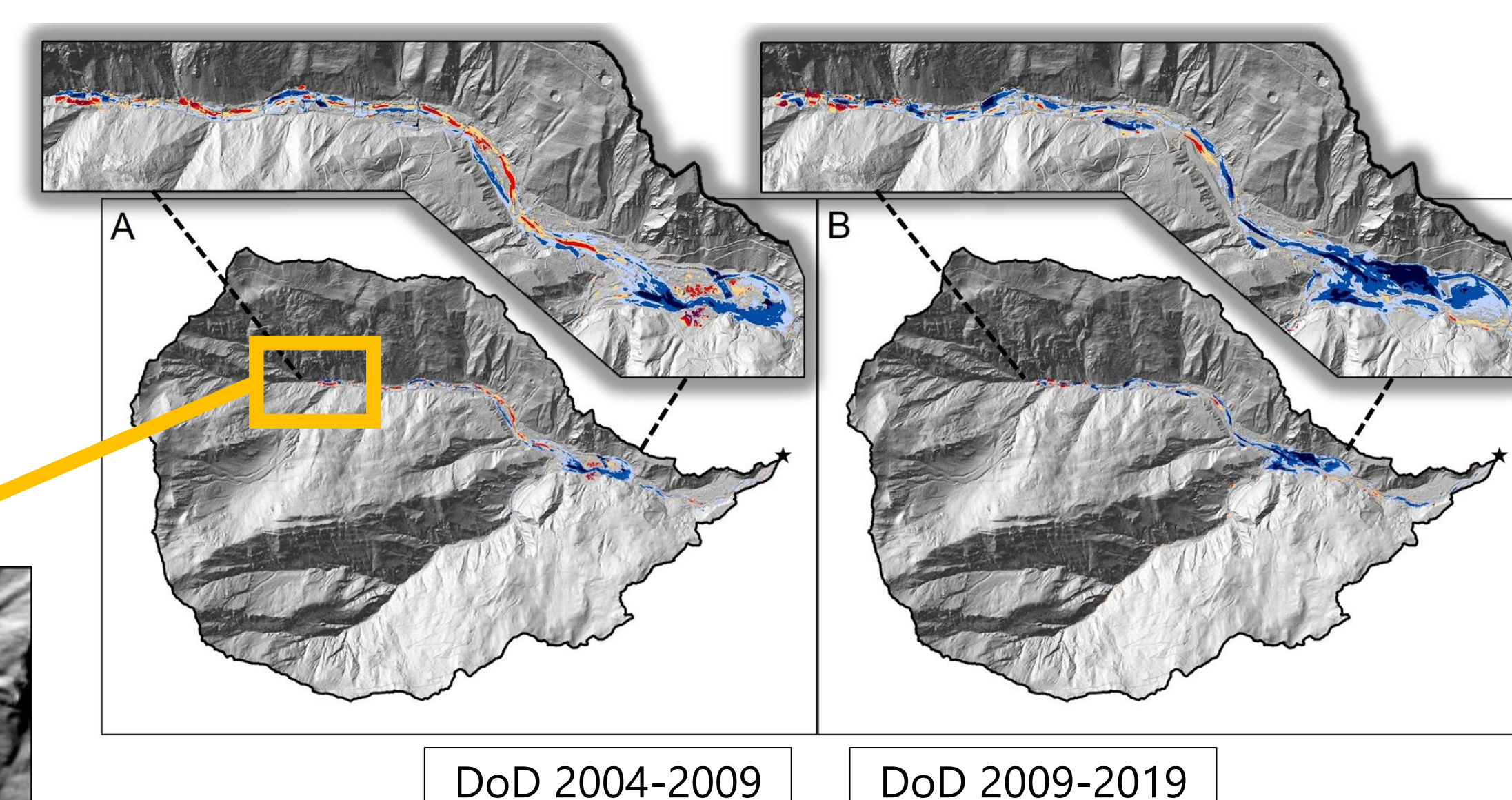


Results

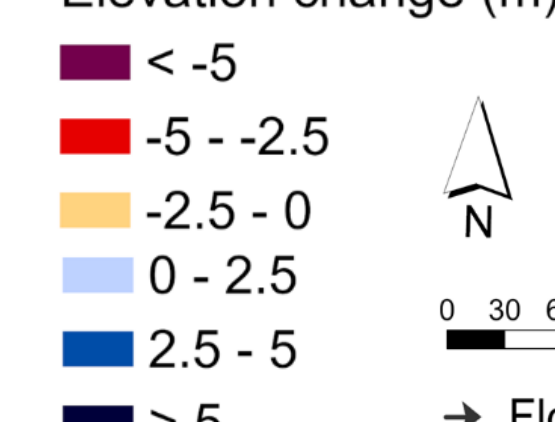


Very simple, quick, and user-friendly MP index of channel control structures

DTMs of Difference (DoDs)



DoD
Elevation change (m)



Multi-temporal DoDs to analyse sediment morphology dynamics at catchment and reach scale

- **More complete information**, than in the past, by exploiting field surveys and remote sensing data
- **A starting point for further analysis** or provide numerical data for prediction models of the life-cycle of channel control works in risk management processes
- **A support for the development of watershed management strategies**, assess afterward the effectiveness of existing structures, and foster a more complete decision-making chain

References:

Cucchiaro et al., 2024 (CATENA)



Acknowledgments

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