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Preliminary study of Fella and But watersheds: how to exploit databases of channel control structures and High-Resolution Topography (HRT)

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25 November 2024

Preliminary study of Fella and But watersheds: how to exploit databases of channel control structures and High-Resolution Topography (HRT)

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[2] University of Trieste (DSV), Department of Life Sciences, Via E. Weiss, 2, 34128 Trieste, Italy (giorgia.chiarel@phd.units.it)
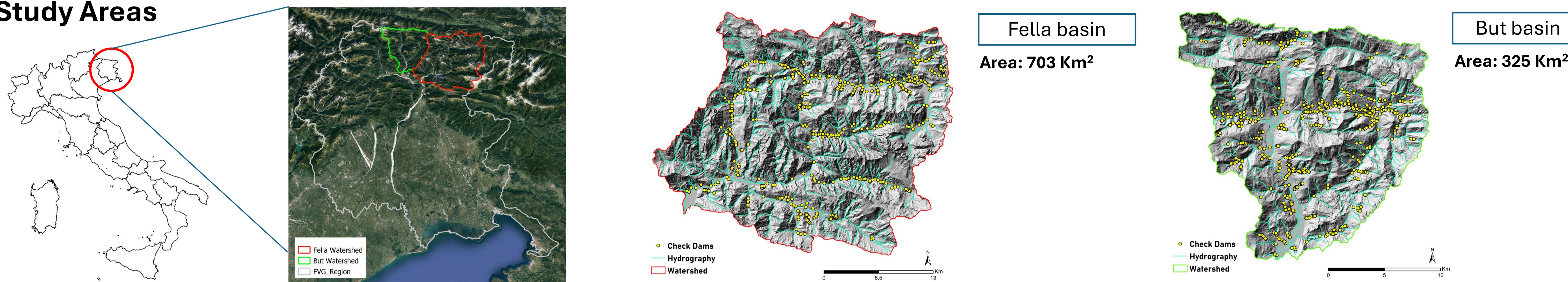[3] National Research Council – Research Institute for Geo-hydrological Protection (CNR-IRPI), Corso Stati Uniti 4, 35127 Padova, Italy (marco.cavalli@irpi.cnr.it)

uniUD
HydroLab
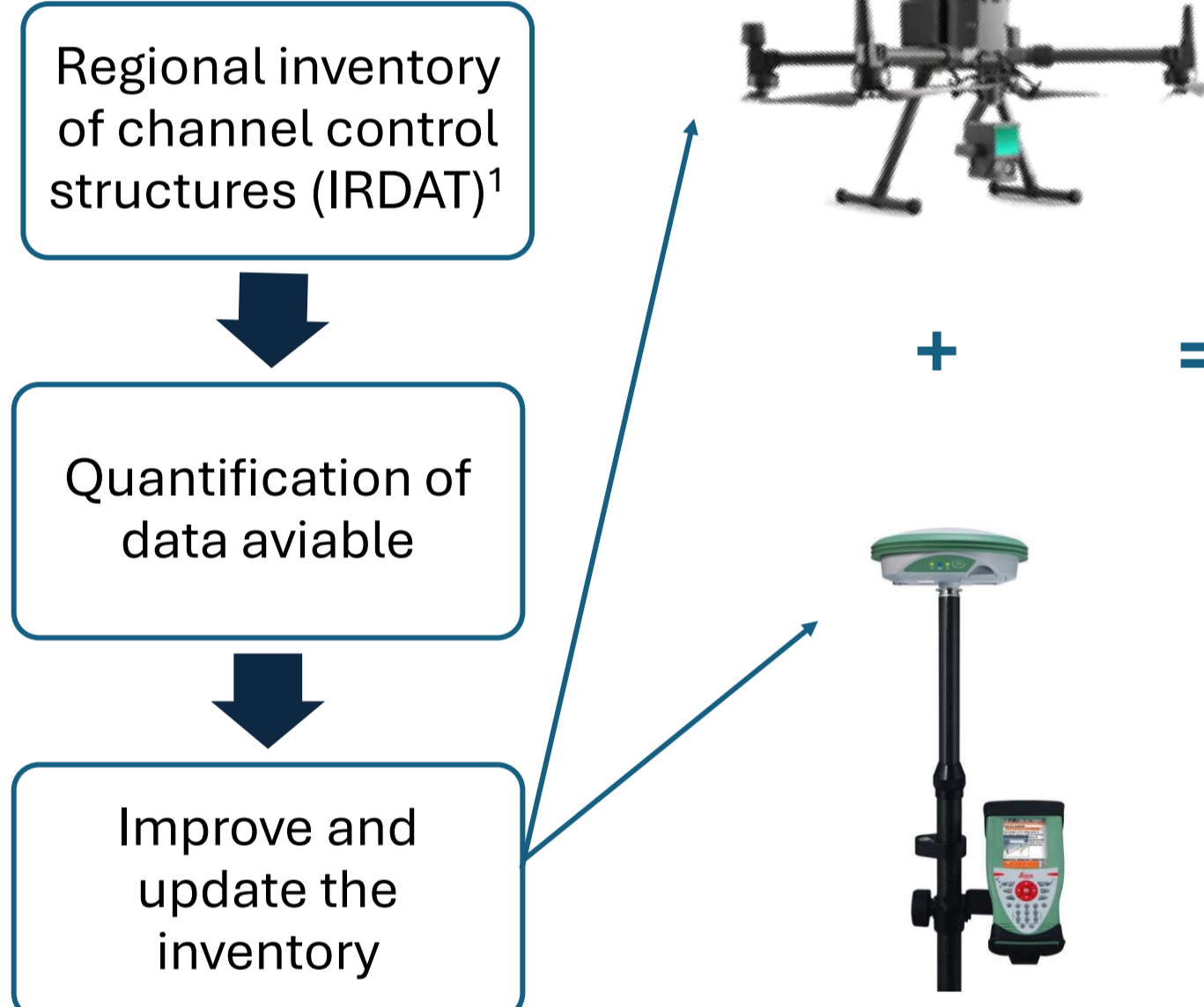Progress in hydrology
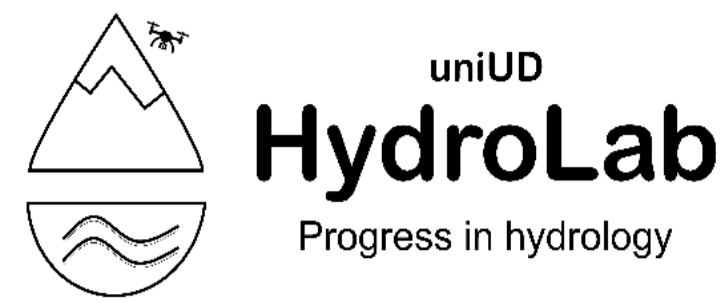
Introduction

The study of sediment dynamics and its interaction with channel control structures enables effective hydrological risk mitigation.
An updated inventory of these structures is crucial for monitoring and planning both old and new prevention works.
High-resolution topography data (HRT), such as LiDAR, is essential for accurately mapping watershed characteristics and to perform multi-temporal analysis.
The combination between multi-temporal analysis and channel control structures inventory is important to improving monitoring actions
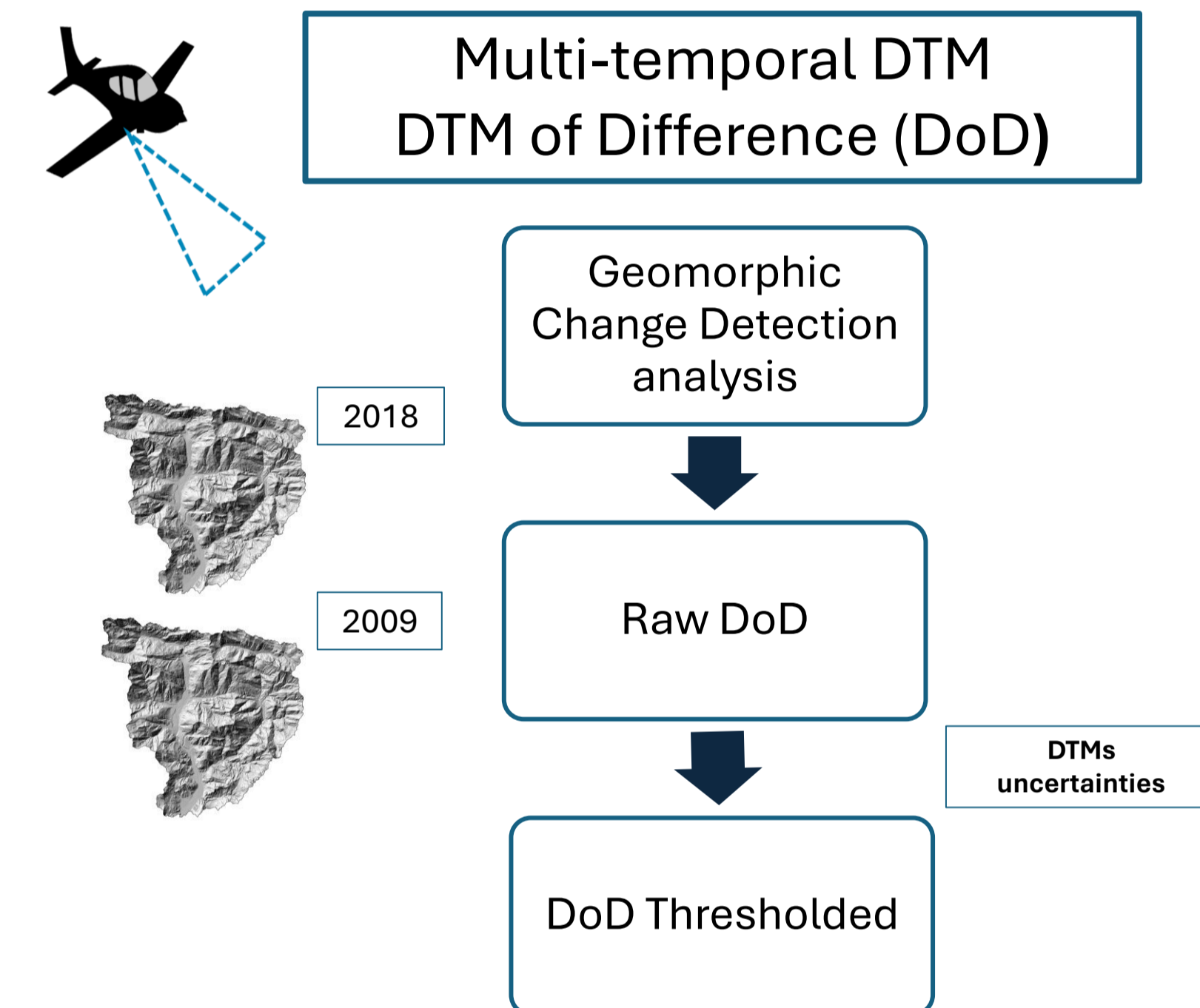
Study Areas

Fella basin
Area: 703 Km²

But basin
Area: 325 Km²

Check Dams
Hydrography
Watershed

Methods

CHANNEL CONTROL STRUCTURES INVENTORY

Regional inventory of channel control structures (IRDAT)[1]
↓
Quantification of data aviable
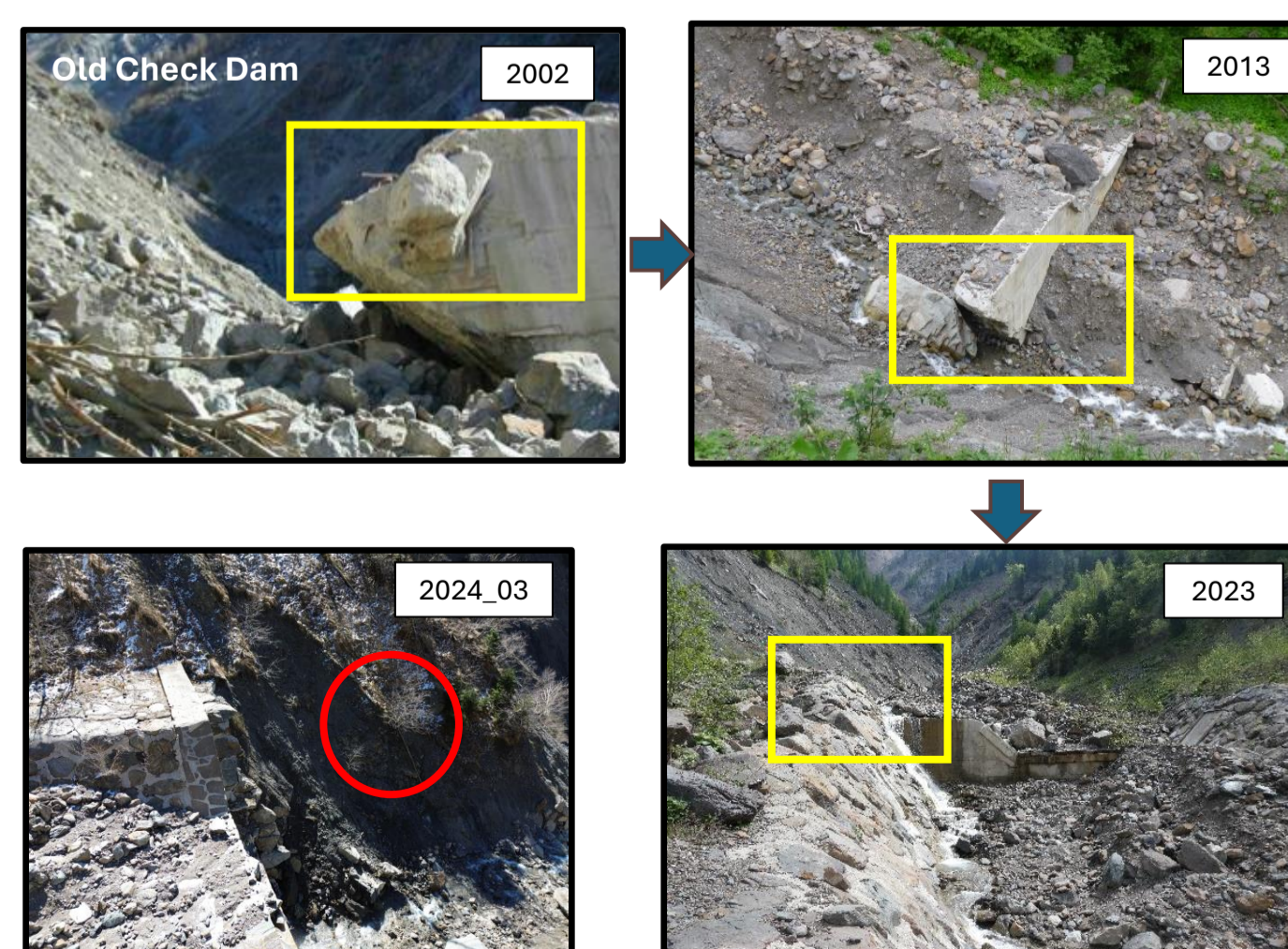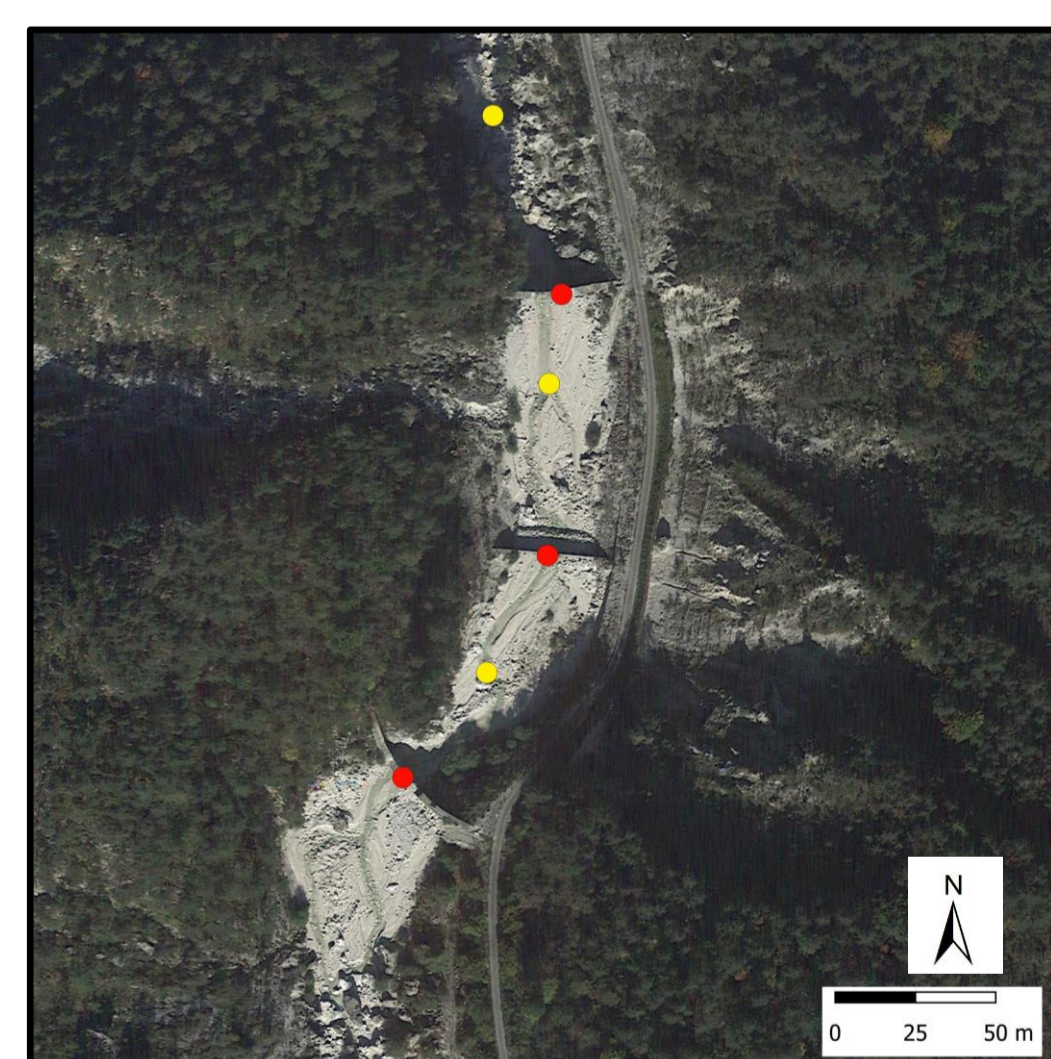↓
Improve and update the inventory

Bed sill
Open check dam
Check dam
Check dam

MULTI-TEMPORAL TOPOGRAPHIC DATA

Multi-temporal DTM
DTM of Difference (DoD)

2018
2009

Geomorphic Change Detection analysis
↓
Raw DoD
↓ DTMs uncertainties
DoD Thresholded

Results

IRDAT Channel Control Structures Inventory

BUT basin; % of data available   Number of check dams : 1285
96,6%   57,0%   0,3%   0%
Heights   Year of construction   Construction material   Coating material

FELLA, basin; % of data available   Number of check dams : 992
93,4%   99,1%   2,0%   0,1%
Heights   Year of construction   Construction material   Coating material

Check Dams - IRDAT Channel Control Structures Inventory
Check Dams - Field Survey

Old Check Dam   2002   2013
2015_12   2018_06   2024_03   2023
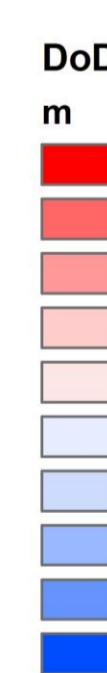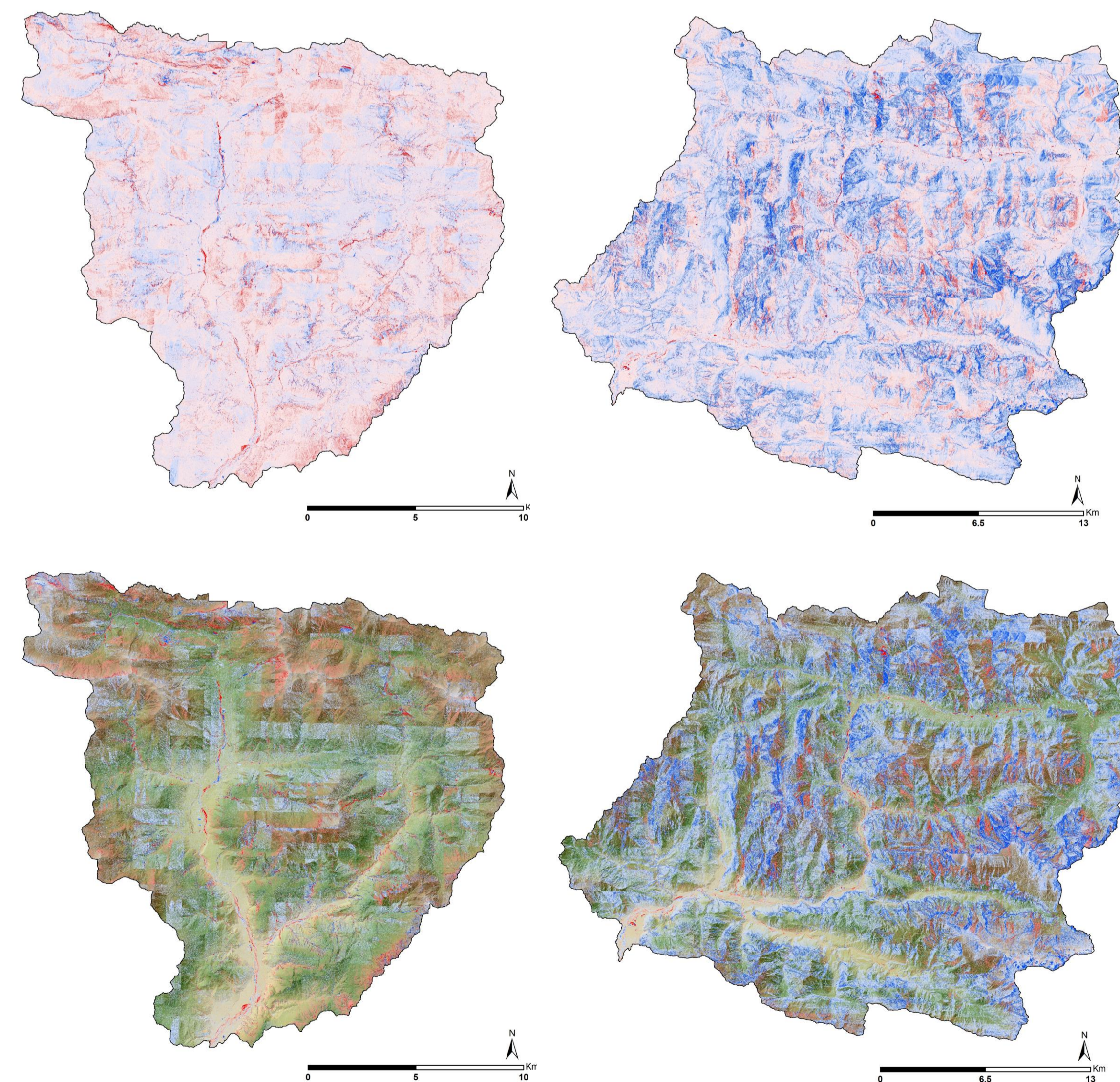
RAW DoD

DoD
m
< -2
-2 - -1.5
-1.5 - -1
-1 - -0.5
-0.5 - 0
0 - 0.5
0.5 - 1
1 - 1.5
1.5 - 2
2 >

TRESHOLDED DoD

Conclusions

Regional Channel Control Structures inventory
- Not accurate GNSS precision of location
- Need to update
- Need to increase information on status, functionality and materials of channel control structures

High- Resolution Topography dataset (HRT)
- Necessity to post-processing for multi-temporal analysis (Not ready-to use)
- Co-registration of point cloud (raw data)
- Problem of processing HRT data for large spatial scale

References
[1] IRDAT. http://irdat.regione.fvg.it/Web GIS