MOVE
Methods for the Improvement of Vulnerability Assessment in Europe

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Improvement of vulnerability curves using data from extreme events: a debris flow event in South Tyrol, Italy

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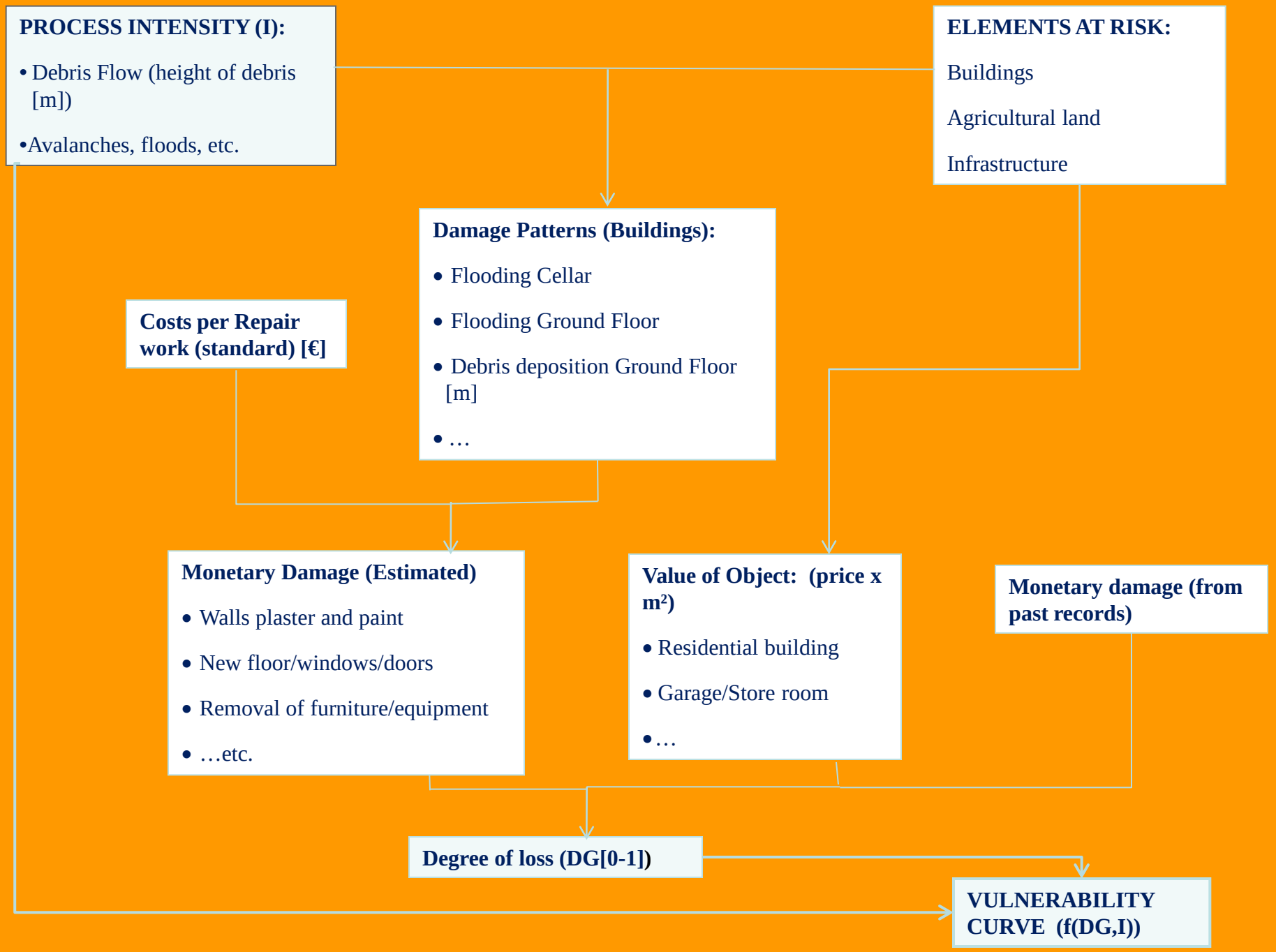
Background and Objectives

MOVE project (FP7)

Methods for Improving Vulnerability Assessment in Europe

- AIM: Provide stakeholders with a tool which can assess potential monetary damage for different scenarios and support decision making


PROCESS INTENSITY (I):
• Debris Flow (height of debris [m])
•Avalanches, floods, etc.
ELEMENTS AT RISK:
Buildings
Agricultural land
Infrastructure
Damage Patterns (Buildings):
• Flooding Cellar
• Flooding Ground Floor
• Debris deposition Ground Floor [m]
• …
Costs per Repair work (standard) [€]
Monetary Damage (Estimated)
• Walls plaster and paint
• New floor/windows/doors
• Removal of furniture/equipment
• …etc.
Value of Object: (price x m²)
• Residential building
• Garage/Store room
• …
Monetary damage (from past records)
Degree of loss (DG[0-1])
VULNERABILITY CURVE (f(DG,I))

Case Study


Source: Municipality of Martell


Source: Municipality of Martell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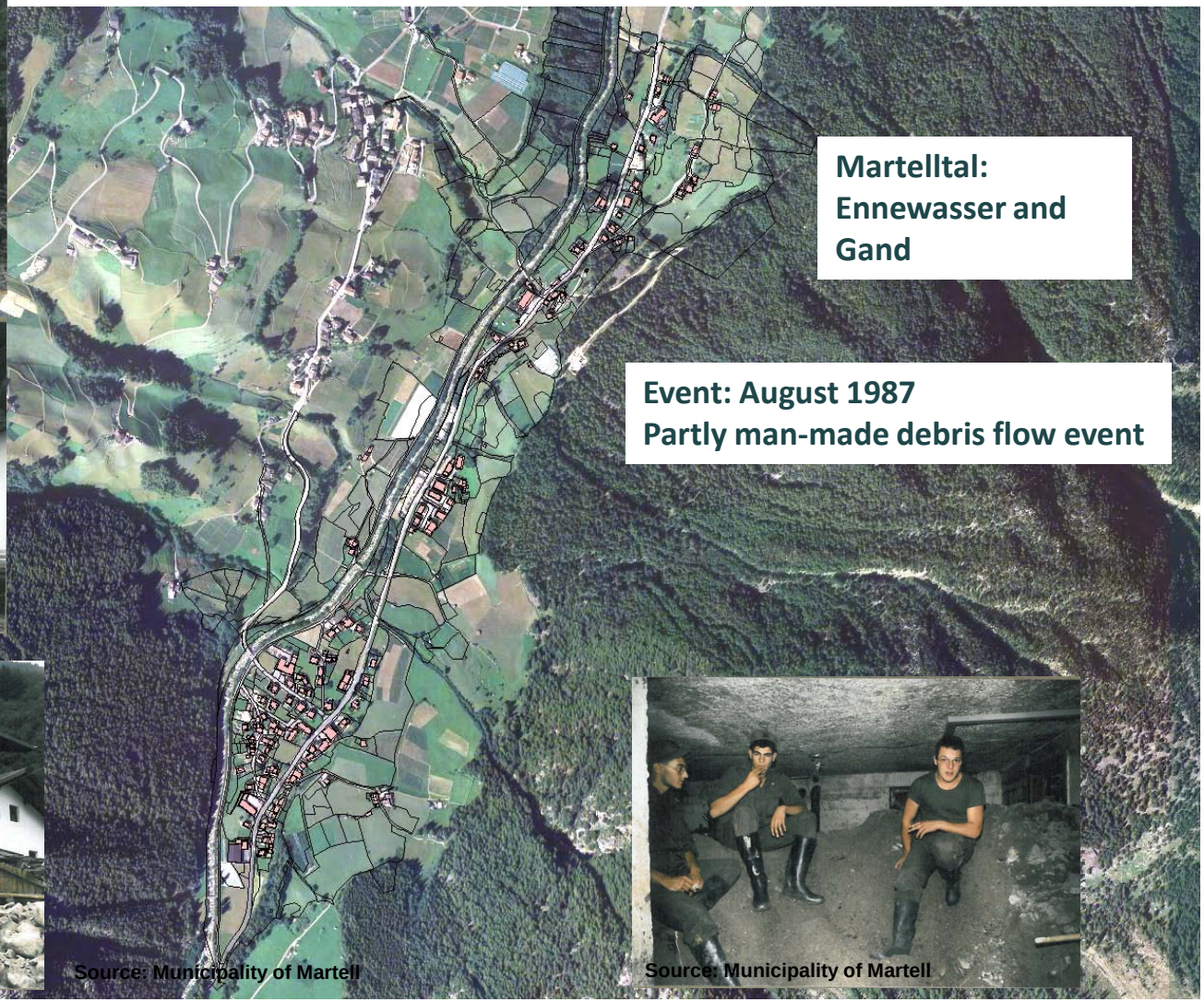

Source: Municipality of Martell

Martelltal: Ennewasser and Gand

Event: August 1987
Partly man-made debris flow event

Source: Municipality of Martell

Example


Source: Municipality of Martell


Source: Municipality of Martell

Building Characteristics

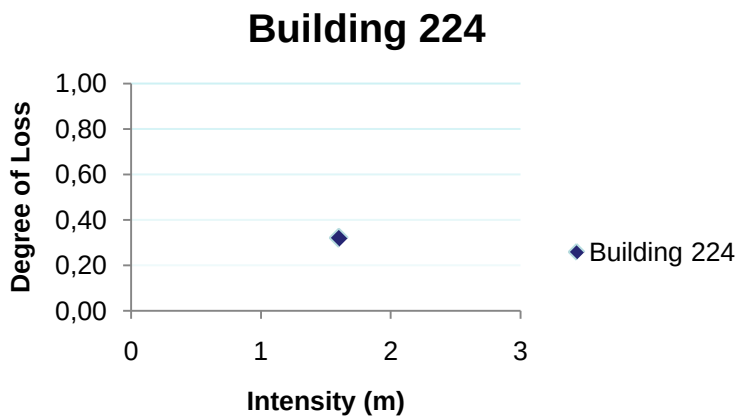
Municipality: Martell (Gand)
Use: Residential building
Area: 115m²

Process Characteristics

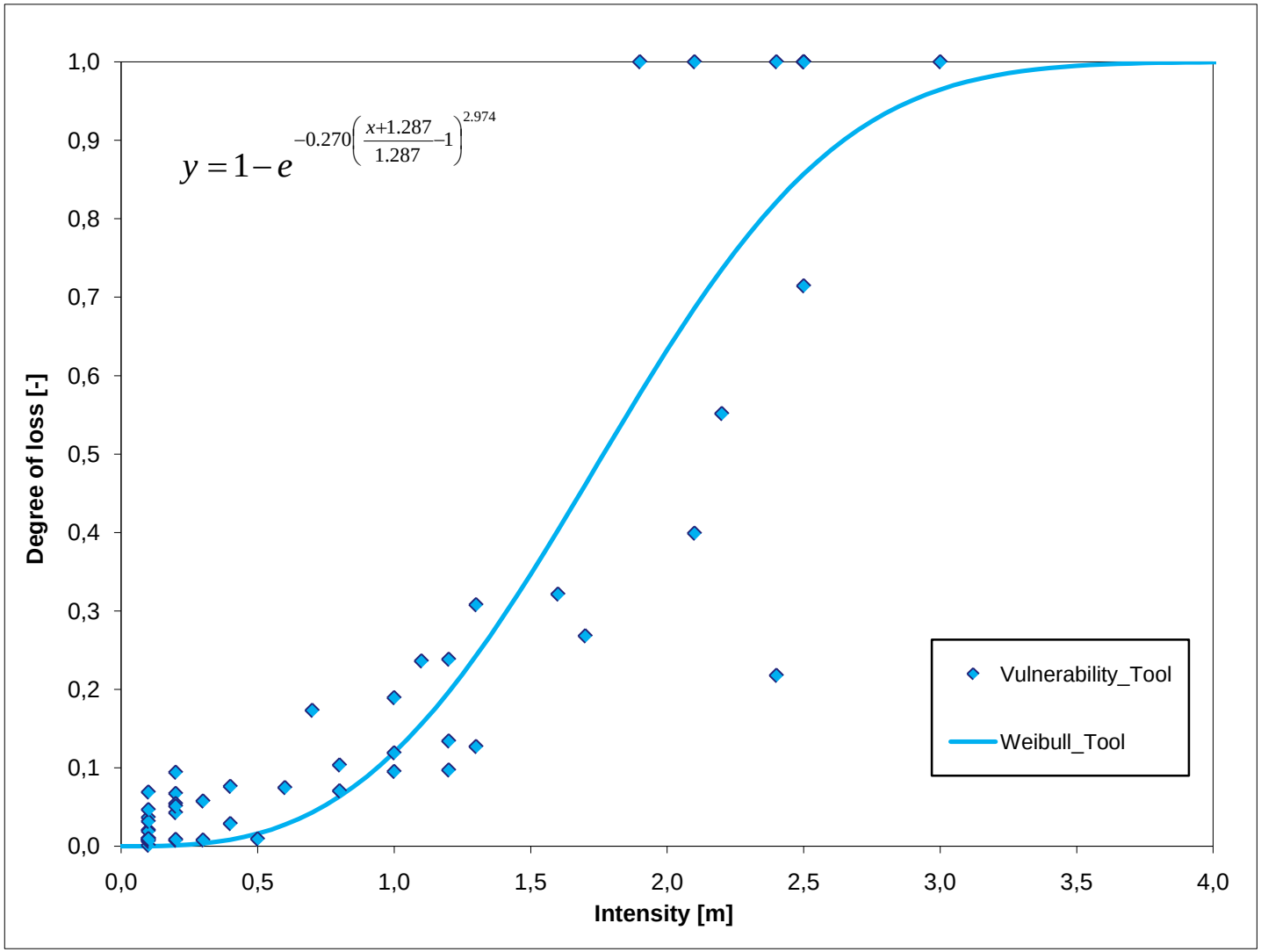
Type: Debris Flow
Intensity: 1,5m

Damage Pattern

Estimated monetary damage	97957 €
Compensation	106236 €
Value	305000 €
Degree of Loss (Estimated)	0,32
Degree of Loss (Validation)	0,35

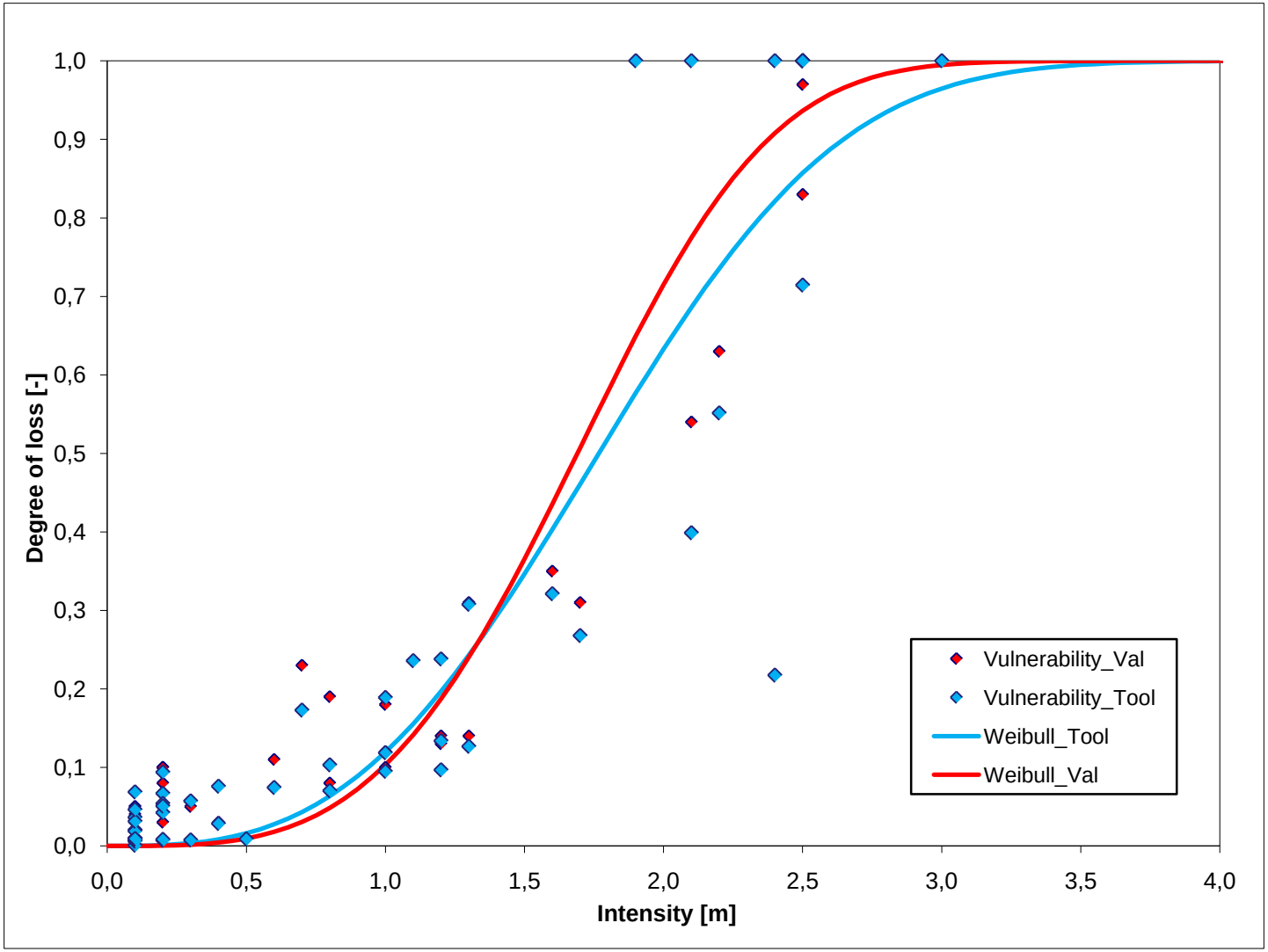


Vulnerability Curve



R^2= 0,835

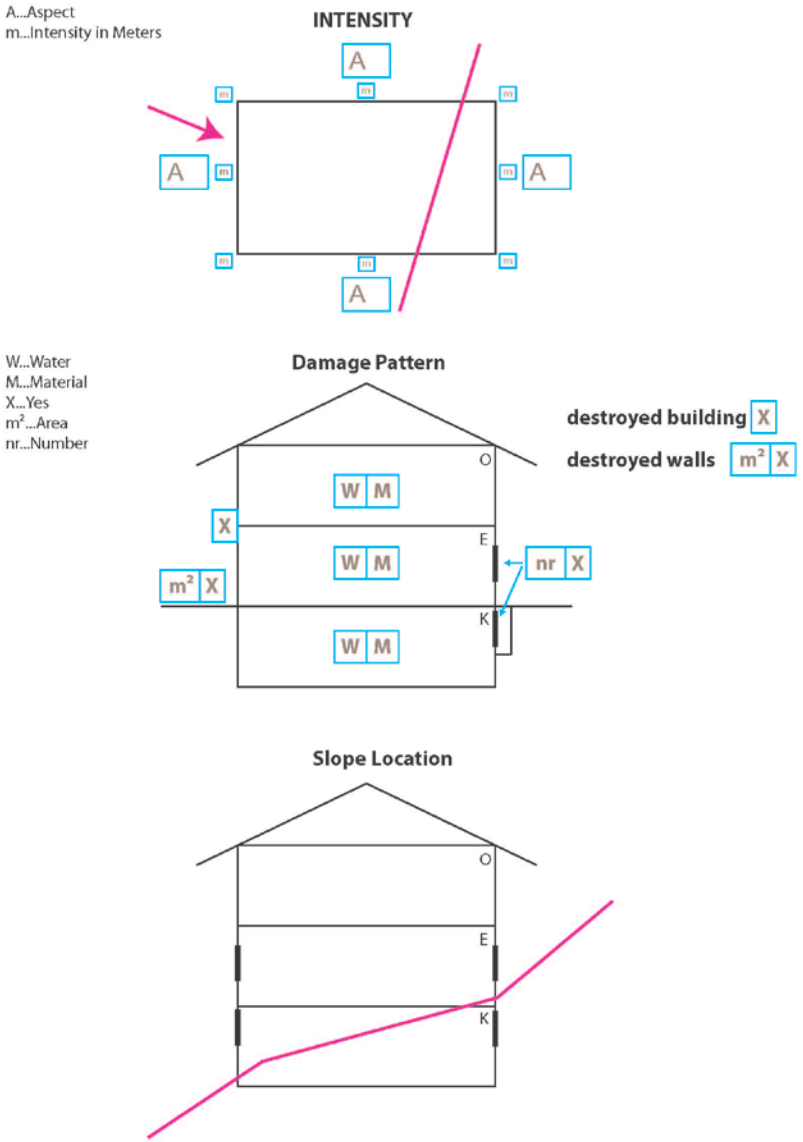
Vulnerability Curve and Validation



Problems and Limitations

- Few events provide the required amount of data
- Difficulty in calculating the monetary damage
- Difficulty in expanding to more alpine hazards and elements at risk (intensity)
- Inadequate documentation of damage

New Documentation for Damage Assessment



BUILDING CONDITION FORM

BUILDING-ID .....*(For internal use)*
EVENT-ID...
PHOTO-ID...

BUILDING INFORMATION
Address:....
Municipality:.....

Use:
- ☐ Residential
- ☐ Auxiliary building — Type: ...
- ☐ Business/shop — Type: …
- ☐ Public building — Type: ...
- ☐ Other — Type: ...

Area: ....
Age: .....
Number of floors: ....
Building material:
- ☐ Wood
- ☐ Mixed
- ☐ Bricks
- ☐ Reinforced

Basement: ☐ Yes ☐ No

Building surroundings:
- ☐ Wall
- ☐ Fence
- ☐ None

Surrounding vegetation
- ☐ Trees
- ☐ Bushes
- ☐ none

Openings (Slope side):
Type: ....
Amount:....
Size:....
Quality:…

Openings (Sides):
Type:....
Amount:....
Size:…
Quality:…

Protection measures: ☐ Yes ☐ No
If yes, which one:…..

Next steps

- More data from South Tyrol
- Tool programming in progress
- Uncertainty Analysis

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Thank You!

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