



LA MODELLAZIONE

nelle colate detritiche con Flo-2D

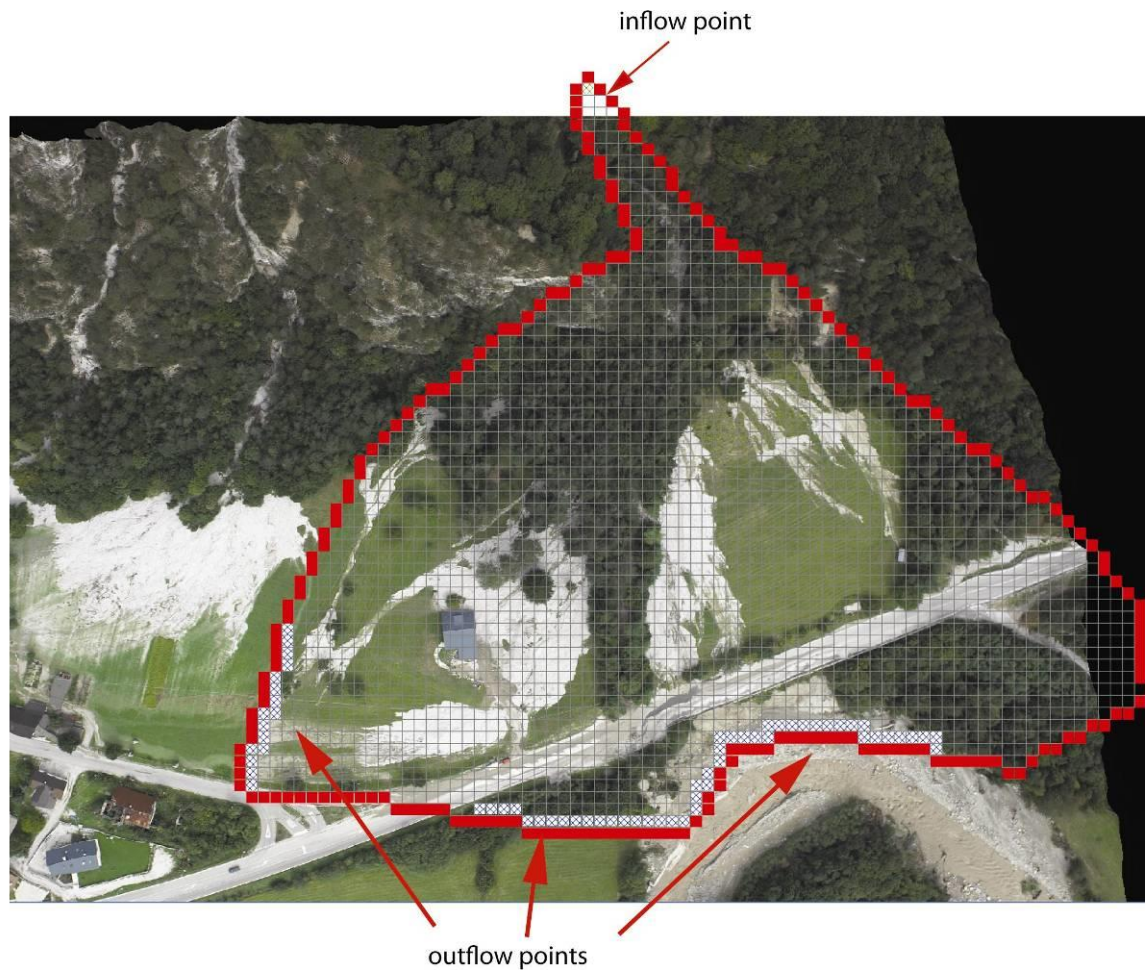
Parametri di input nel software Flo-2D

- DTM data (from CTRN or laser scann data)
- Computational domain (cell size 5x5 m)
- Inflow points / Outflow points
- Inflow hydrograph and C_v
- 12 couples of rheological parameters (choosed from bibliography)

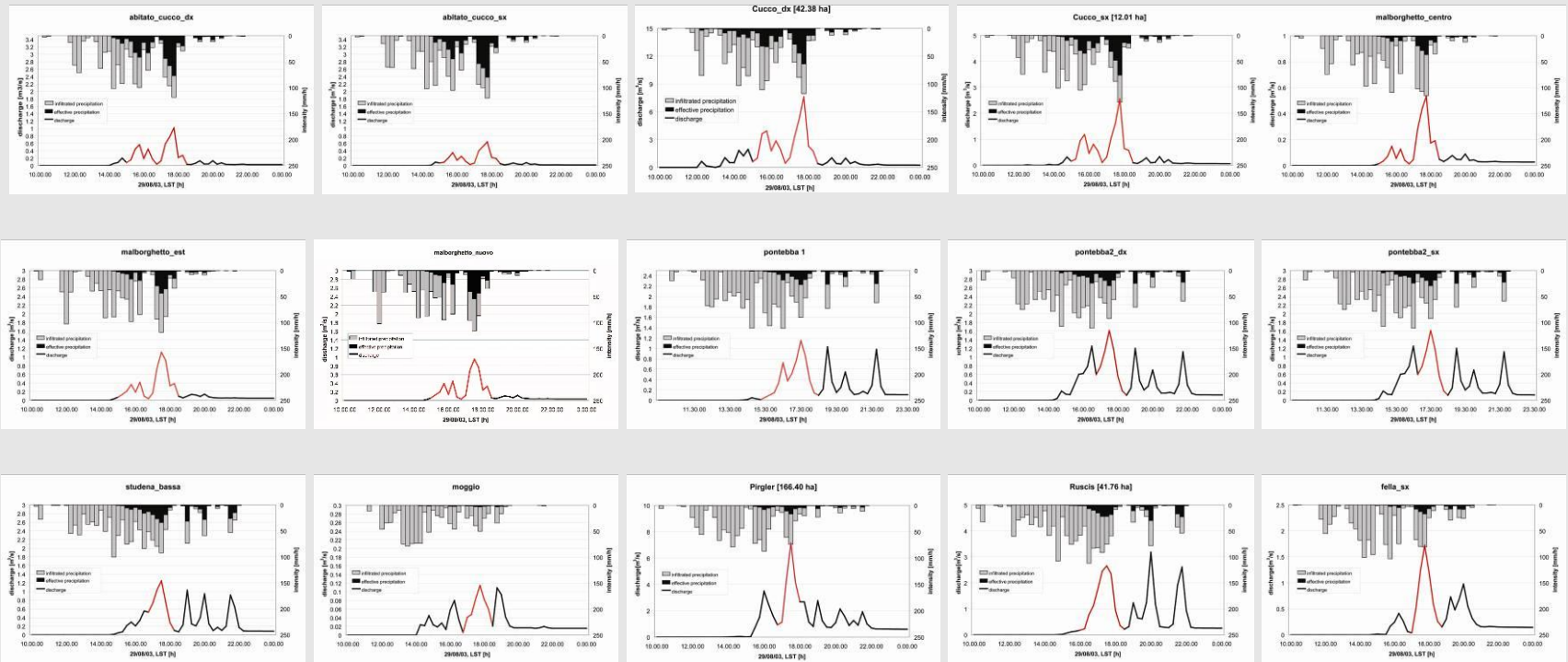
FLO-2D: input file (an example)

Computational
domain
(5x5 m)

From CTRN or laser
scanner data where
available



Alluvional event: 29 august 2003



Un'idrogramma di piena è dato dalla trasformazione di afflussi generati da un certo evento meteorico in deflussi superficiali osservati nella sezione di chiusura del corso d'acqua (Nicola, 2007).

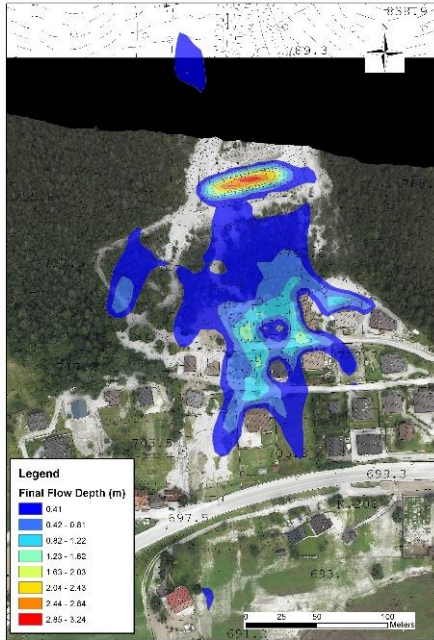
Nell'ambito del presente studio la risposta idrologica è stata sviluppata tramite l'elaborazione di un modello idrologico spazialmente distribuito, detto **KLEM** (Kinematic Local Excess Model). **Tale modello si basa su informazioni topografiche, su dati di piovosità e di infiltrazione e sulle proprietà del suolo e della sua copertura**; questi ultimi vengono descritti tramite il parametro CN (Curve Number), che può assumere valori da 1 a 100 e viene stimato tramite indagini di campagna. Il modello è stato debitamente testato in nove differenti bacini dei fiumi Slizza e Fella (Borga et al., 2007).

FLO-2D, BACK ANALYSIS: I PARAMETRI REOLOGICI UTILIZZATI

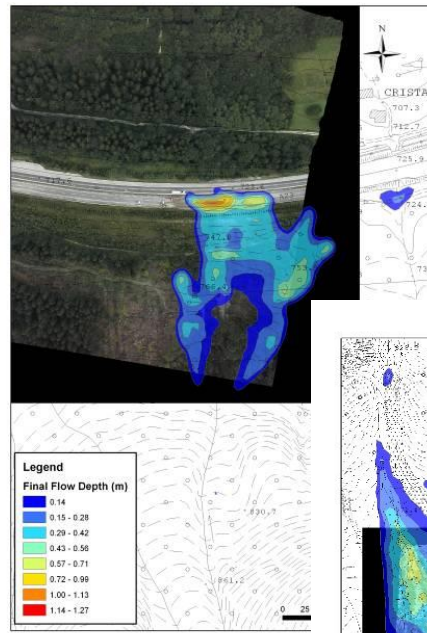
Simulation	η		τ		Model
	α_1	β_1	α_2	β_2	
Simulation 1	0.036	22.1	0.181	25.7	Aspen Pit 1
Simulation 2	0.0538	14.5	2.72	10.4	Aspen Pit 2
Simulation 3	0.00136	28.4	0.152	18.7	Aspen Natural Soil
Simulation 4	0.128	12	0.0473	21.1	Aspen Mine Fill
Simulation 5	0.000495	27.1	0.0383	19.6	Aspen Watershed
Simulation 6	0.000201	33.1	0.291	14.3	Aspen Mine Source Area
Simulation 7	0.00283	23	0.0345	20.1	Glenwood 1
Simulation 8	0.0648	6.2	0.0765	16.9	Glenwood 2
Simulation 9	0.00632	19.9	0.000707	29.8	Glenwood 3
Simulation 10	0.000602	33.1	0.00172	29.5	Glenwood 4
Simulation 11	0.0075	14.39	2.6	17.48	Dai et. al (1980)
Simulation 12	0.0075	14.39	0.152	18.7	Tecca et al.

Boniello M. A., Calligaris C., Lapasin R., and Zini L. (2010) Rheological investigation and simulation of a debris-flow event in the Fella watershed - Nat. Hazards Earth Syst. Sci., 10, 989-997. doi:10.5194/nhess-10-989-2010. ISSN: 1561-8633

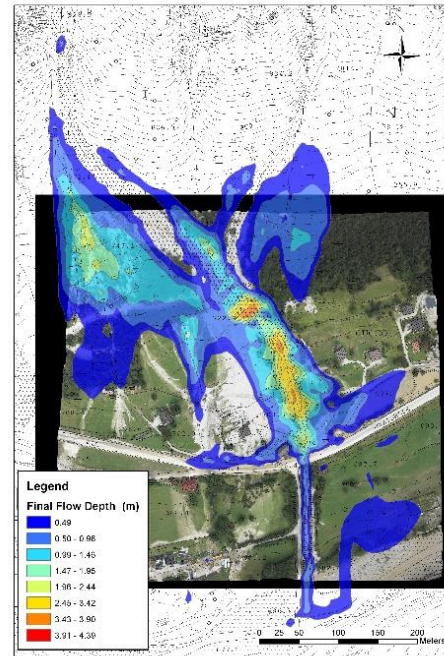
FLO-2D: back-analysis



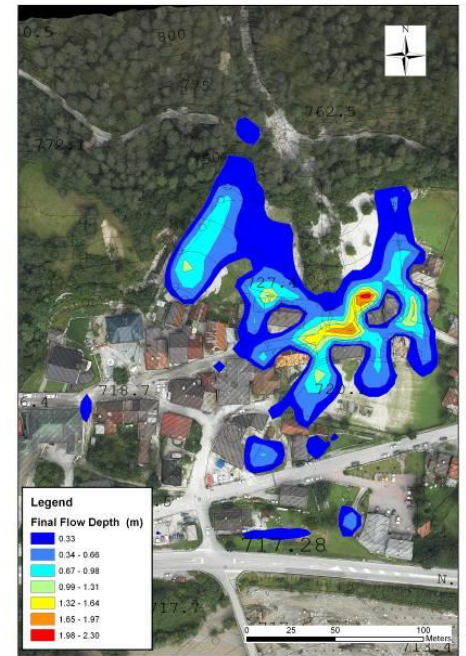
Abitato Cucco



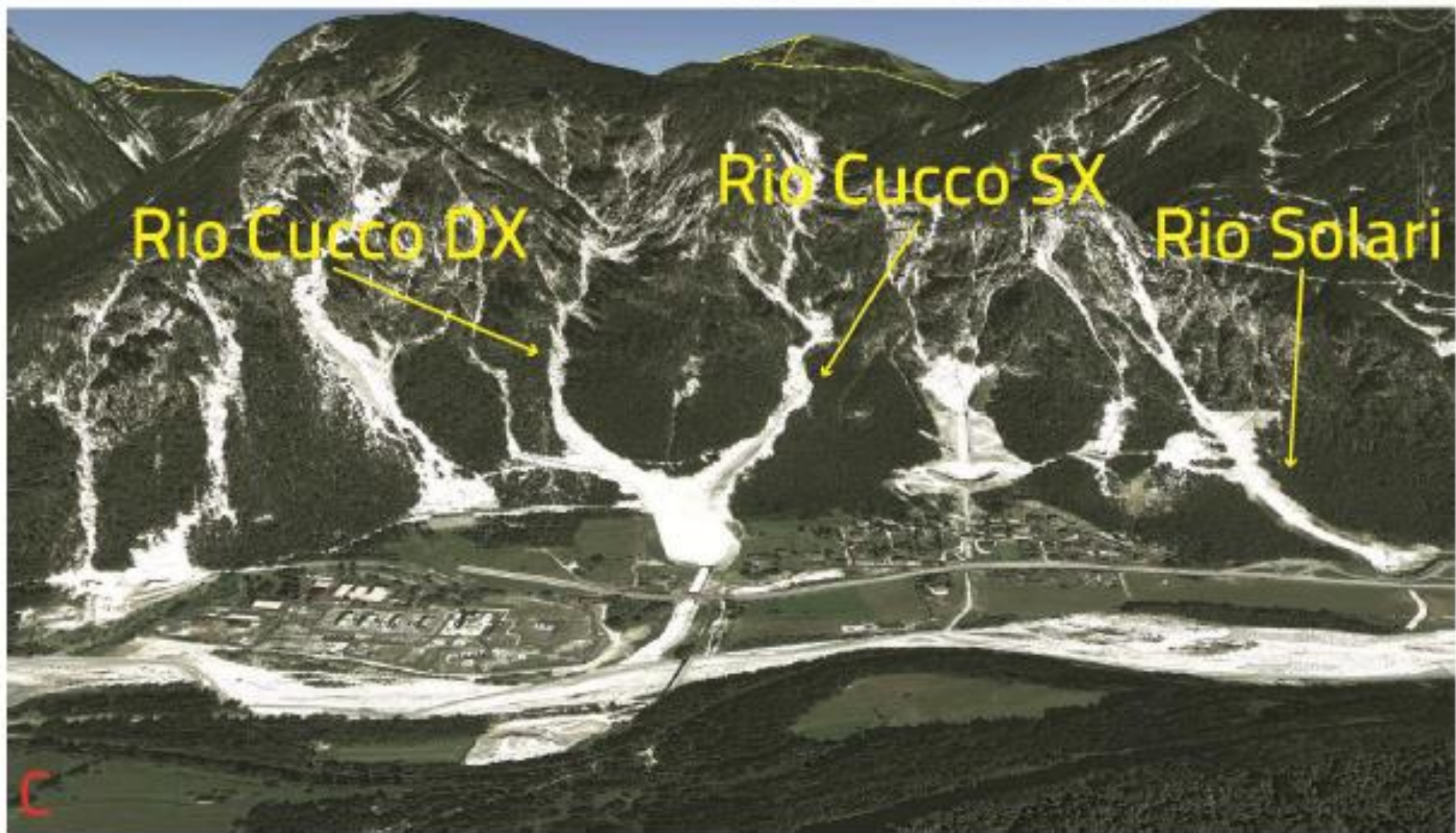
Fella sx



Rio Cucco



Malborghetto



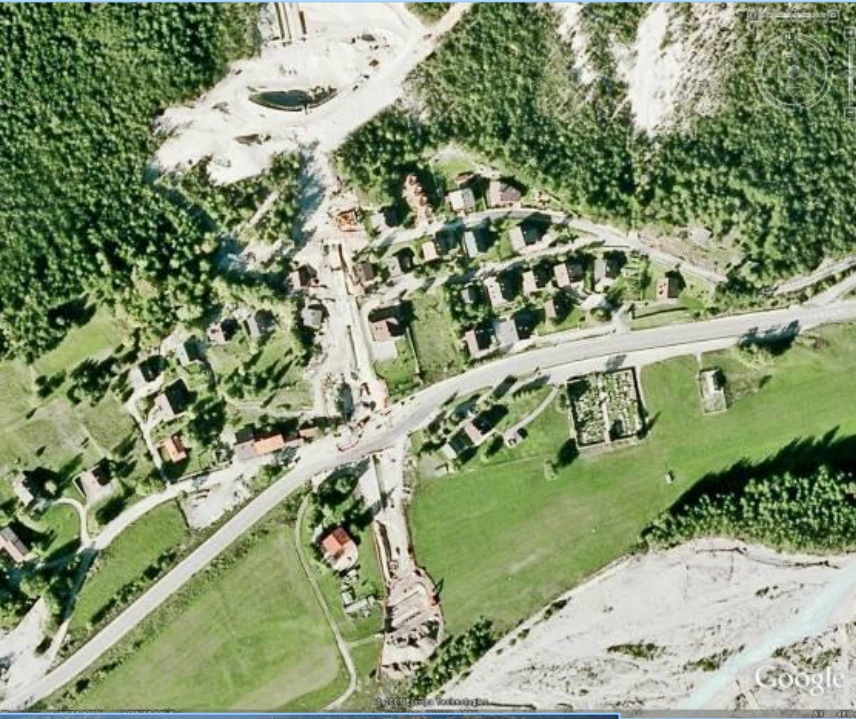
Rio Cucco DX

Rio Cucco SX

Rio Solari

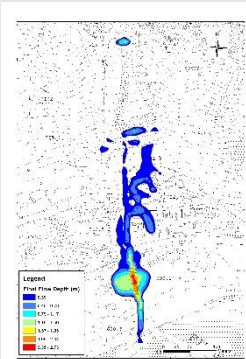
C

OPERE DI MITIGAZIONE: Abitato Cucco

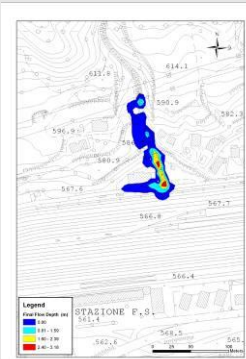


FLO-2D: simulazioni realizzate tenendo in considerazione le opere di mitigazione

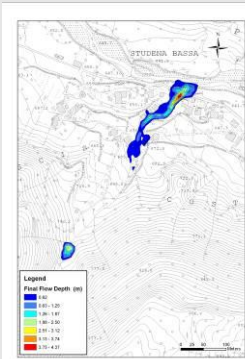
Abitato Cucco



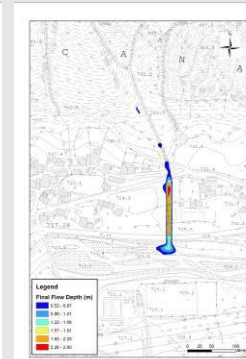
Pontebba 1



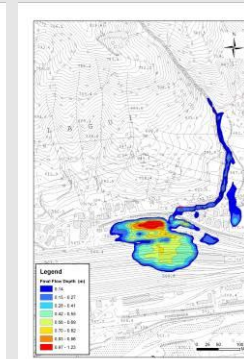
Rio Ruscis



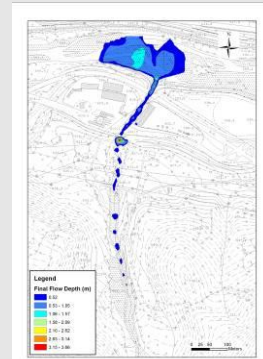
Malborghetto nuovo



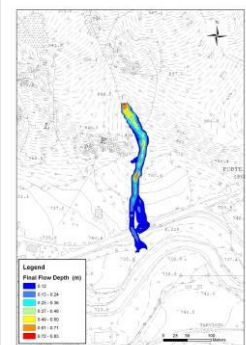
Pontebba 2



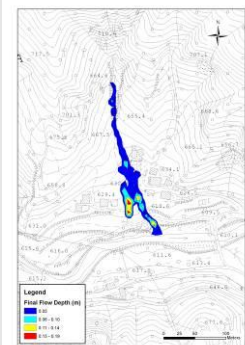
Rio Pirgler



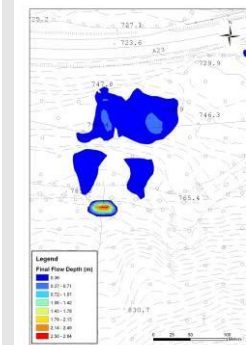
Malborghetto centro



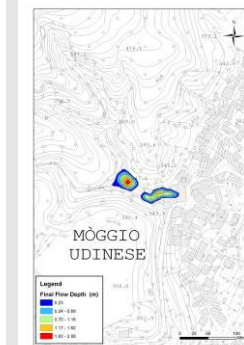
Malborghetto est



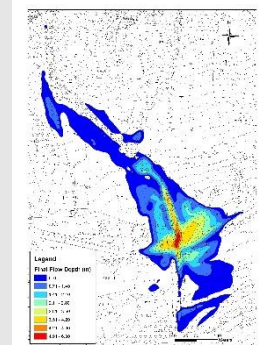
Studena Bassa



Fella sx

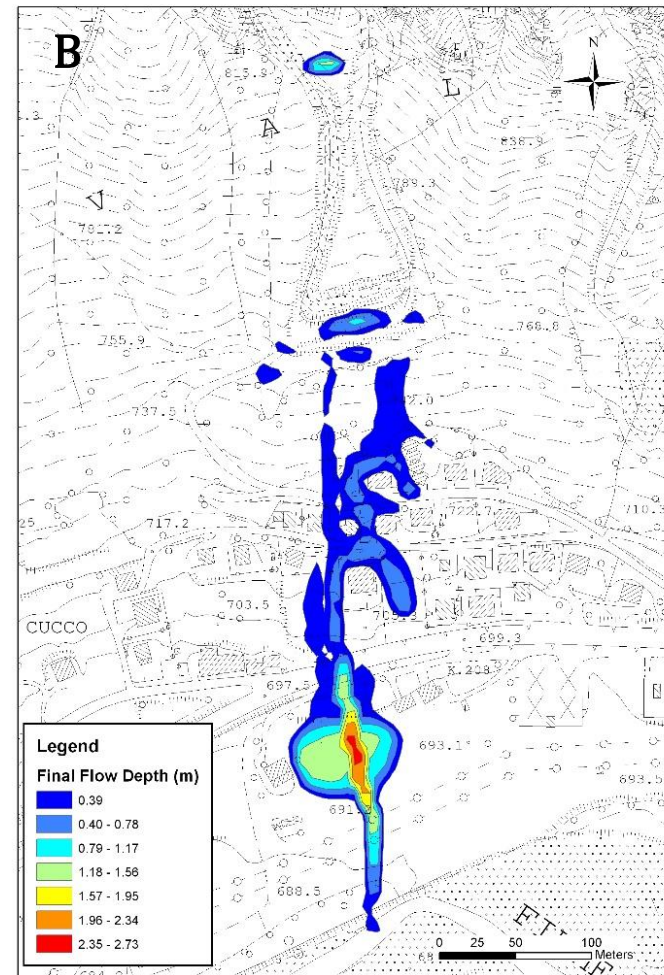
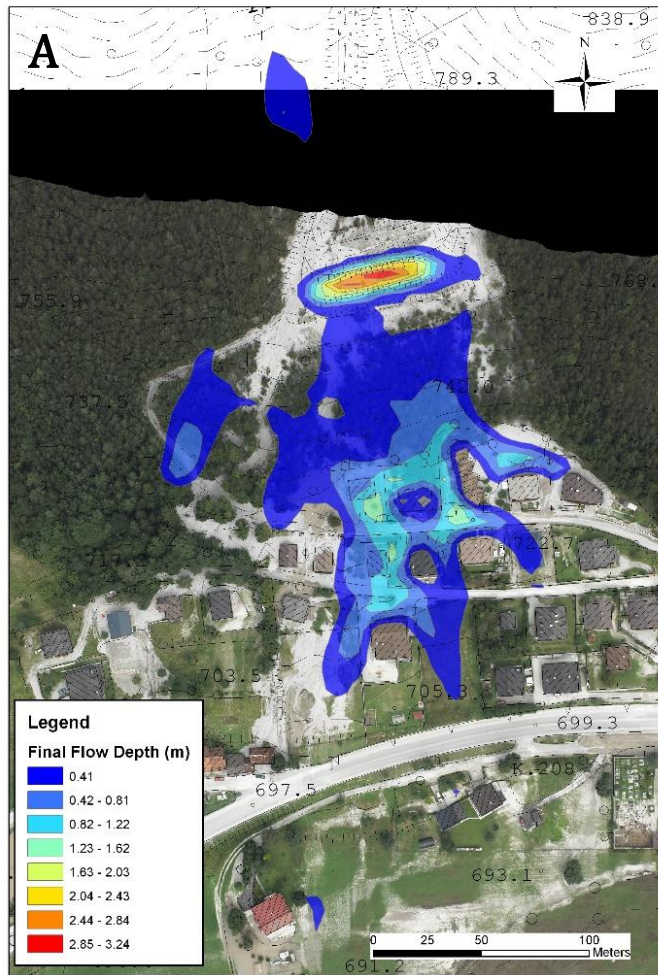


Moggio Udinese



Rio Cucco

FLO-2D: CONFRONTO DEI RISULTATI OTTENUTI



Comparison before (A) and after (B) the realization of mitigation works.

MAPPE DI PERICOLOSITA' RESIDUA

