

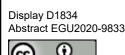
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DISTAV DIPARTIMENTO DI SCIENZE DELLA TERRA, DELL'AMBIENTE E DELLA VITA



CONSIGLIO NAZIONALE DELLE RICERCHE – Istituto di Ricerca per la Protezione Idrogeologica



Ground effects triggered by the 19-21 October 2019 extreme rainfall in the middle-lower Lemme River catchment (NW Italy)

Natural Hazards 3.4 Thursday, 7 May



The rainfall event

Lemme River Catchmen

middle-lower part: mostly cultivated; upper part:

(NW Italy): 180 km² //

650 - 750

750 - 850 850 - 950 950 - 105

8°45'E

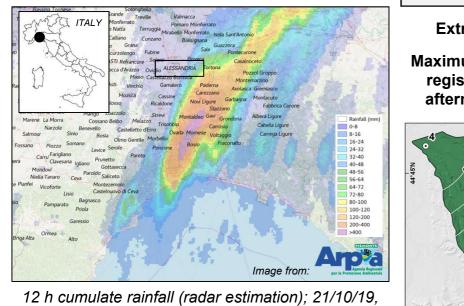
> 1050

550

Image from

(modified)

generally forested.



13:30 - 22/10/19, 01:30 UTC

21/10/19 cumulate rainfall in the Alessandria Province

Alessandria

Extreme rainfall event: 19-21/10/2019 Fraconalto Bric Castellaro Arguata Scrivia Gavi Basaluzzo 600 Maximum rainfall intensity 76.4 mm / 1 h 80 500 205.8 mm / 3 h 21-22/10 450 registered in the 21/10 480 mm/24h 70 400 318.4 mm / 6 h 500 E 60 afternoon and evening Gavi rain 350 432.6 mm / 12 h (*) ₩ 50 300 gauge* rainfall (mm) 300 700 E 40 250 200 > 30 150 -<u></u>20 100 50 Daily Daily Scrivia River Time (h - UTC) Catchment 100 17/10/19 18/10/19 19/10/19 20/10/19 21/10/19 22/10/19 23/10/19 Day Lemme River Catchment Fraconalto —Bric Castellaro —Arquata Scrivia —Gavi Basaluzzo 700 Legenda Municipality boundary 19-21 cumulative rainfall Urban settlemen 600 549 mm (\simeq 1/2 annual rainfall) Contours (mm) show the 12 h 21/10 daily rainfall (mm) (ш 500 cumulative rainfall (from 21/10 -13:00 UTC to 22/10 - 01:00 UTC) rainfall 25 50 • Rain gauge 400 100 Elevation (m) 150 <= 250 Cumulative I 005 007 200 **Orba River** 250 250 - 350 300 Catchment 350 - 450 350 450 - 550 400 450 550 - 650 500

100

0

17/10/19

18/10/19

19/10/19

20/10/19

Day

21/10/19

22/10/19

(Rainfall raw data from ARPA Piemonte)

Research objective: Geomorphic response to extreme rainfall assessment

- Rainfall values analysis - Ground effects characterization

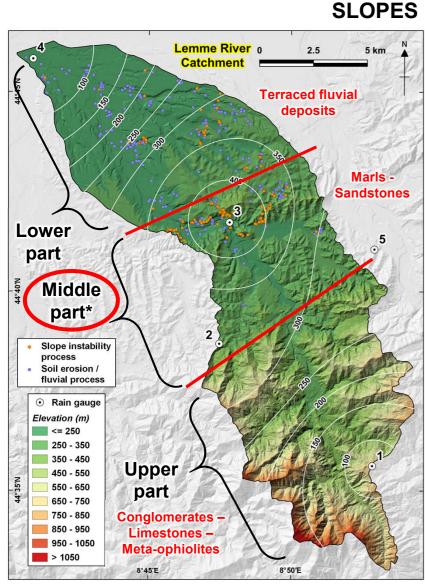
Fraconalto; 2: Bric Castellaro; 3: Gavi Ligure; 4: Basaluzzo; 5: Arguata Scrivia

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8° 50'E



23/10/19



Ground effects

Contours (mm): see the 2nd slide.

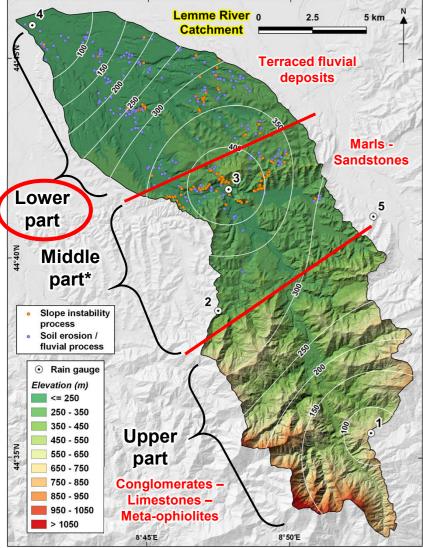
Geomorphic response analysis based on: 1) a wide campaign of field surveys; 2) aerial photographs interpretation (only along the main valley floor)



*Partial inventory of ground effects due to an unfortunate serie of extreme hydrological events

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Ground effects FLUVIAL TERRACES AND SCARPS



Contours (mm): see the 2nd slide



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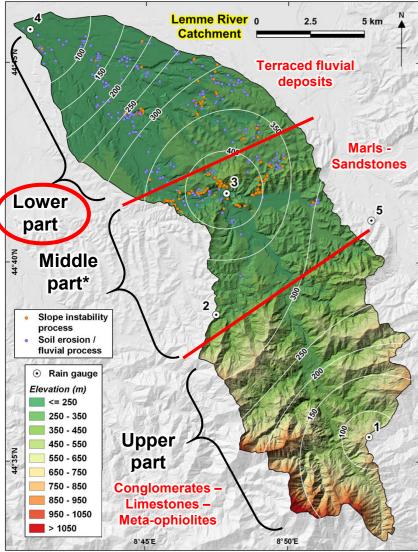
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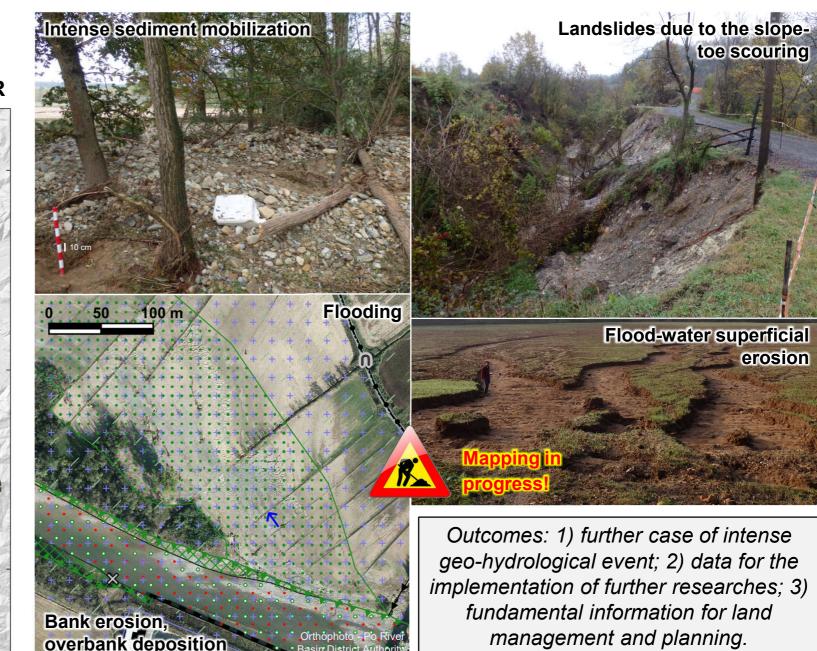
District Authority

A CONTRACTOR OF THE OWNER

Ground effects FLUVIAL STEMS AND VALLEY FLOOR



Contours (mm): see the 2nd slide.



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Thank you for your on-line attention!

Photos by Andrea Mandarino & Piero Mandarino; lower-right photo in the cover slide by Manuela Barisone.

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