

A new exceptional event in the Rio Cordon basin: new challenges are coming after the October 2018 flood



UNIVERSITÀ
DEGLI STUDI
DI PADOVA

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RIO CORDON BASIN

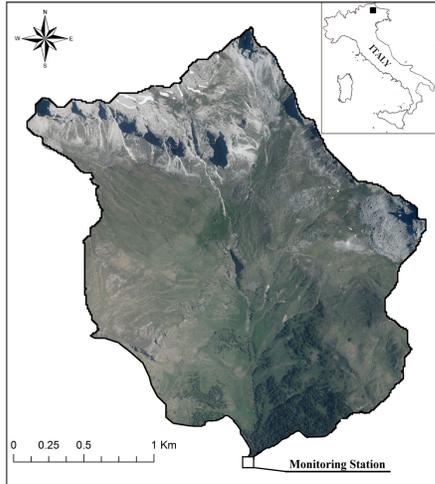


Fig. 1: The Rio Cordon basin

- The Rio Cordon basin (5 km²) exhibits a prevalent **nivo-pluvial runoff regime**.
- Average annual precipitation (1986-2017) = **1150 mm**
- The Rio Cordon stream is a **steep mountain channel** (mean slope = 13%) with step-pool and boulder-cascade morphology.
- **Forests** (*Picea abies* and *Larix decidua*) cover just 7% of the catchment area and are located in the lower part of the basin. Most of the catchment features **Alpine grasslands** (61%) and **shrubs** (18%). The remaining 14% of the basin is **bare land**.
- Since **1986**, the catchment is equipped with a permanent **monitoring station**, which continuously measures the water and sediment fluxes as well the climatic conditions.
- **31 flood events** were recorded in the period 1986-2017. The highest magnitude was exhibited by the **September 1994 event**: intense precipitations triggered a flood with a peak of discharge equal to 10.40 m³ s⁻¹ and the transport of ~ 900 m³ of bedload material.
- The event of September 1994 altered the streambed configuration and created new sediment sources throughout the watershed. Consequently, an increase in the transport efficiency and an intensification in sediment fluxes were observed for about a decade after the event. For these reason it was defined as an **“exceptional event”**.



Fig. 2: Bedload material transported by September 1994 event

On 29 October 2018 a new exceptional flood occurred in the Rio Cordon basin.

In light of the first field observations, the magnitude seems to be higher than the September 1994 event.

CHARACTERISTICS OF THE EVENT

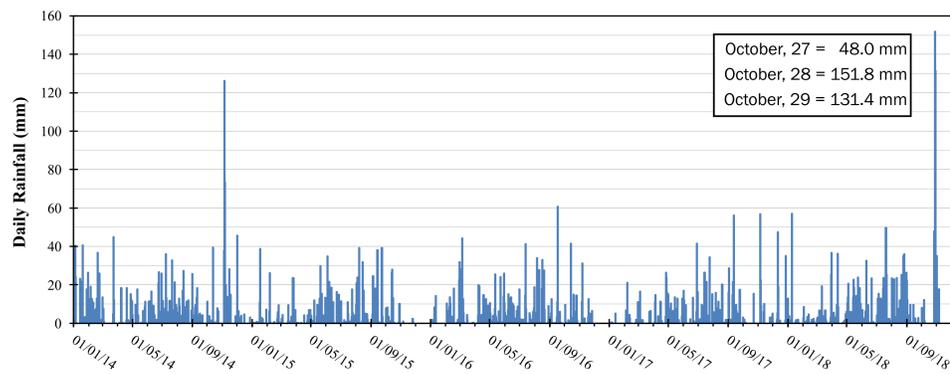


Fig. 3: Daily rainfall recorded in the Rio Cordon basin since 2014 to the present.

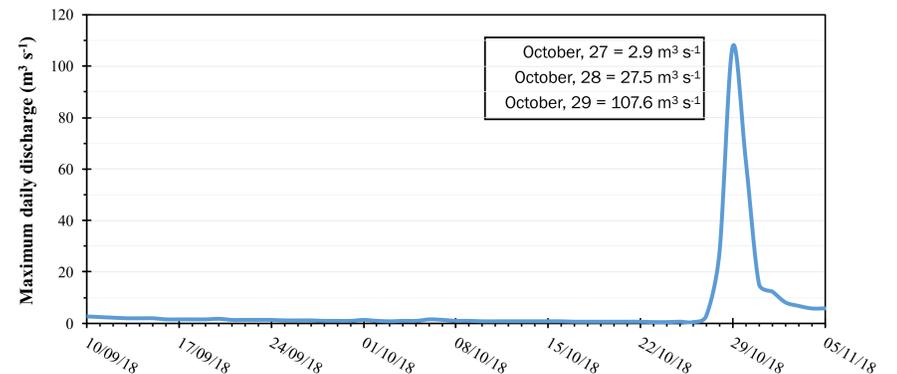
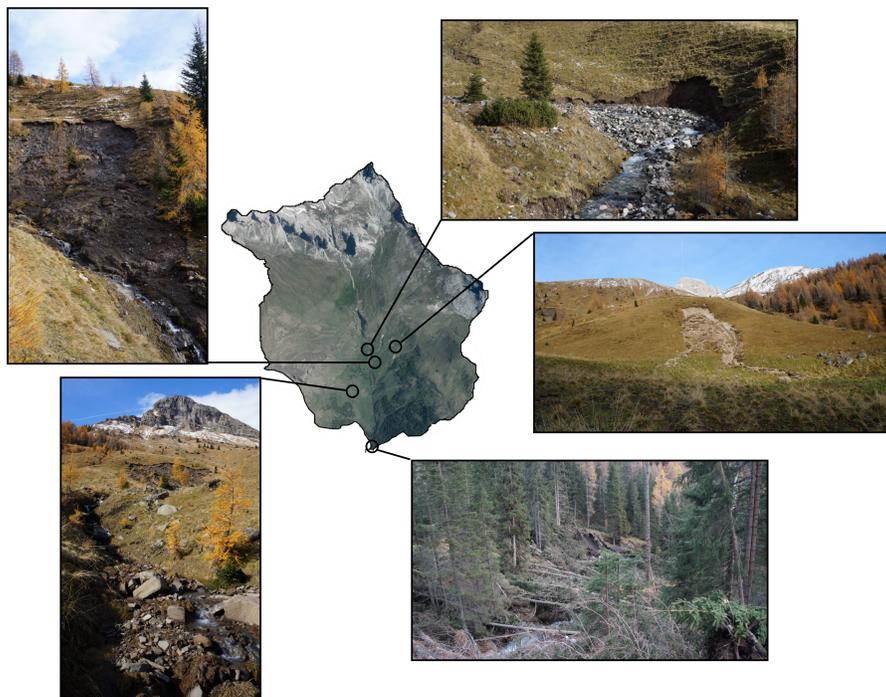


Fig. 4: Maximum daily discharge recorded in the Fiorentina torrent at Sottorovei station (6 km south-west of the Rio Cordon basin, managed by ARPA Veneto).

Between October, 27 and October, 29 a rainfall amount of **331 mm** were recorded, which corresponds approximately to the **30% of average annual precipitation**. The discharge data gathered are still to be elaborated but the water discharge exhibited by the Fiorentina torrent at the Sottorovei station (managed by ARPA Veneto and located 6 km south-west of the Rio Cordon basin) permit to better comprehend the magnitude of the event. In fact, the Rio Cordon watershed (5 km²) is a sub-catchment of the Fiorentina basin (58 km²).

EFFECT ON THE SEDIMENT SOURCES



BEDLOAD MAGNITUDE



The next research activities will be focused on the characterization of the climatic and hydrological conditions of the event as well the description of the sediment dynamics occurred. Also, these dynamics will be investigated in the near future to comprehend the sedimentary response of the basin to the new conditions established.

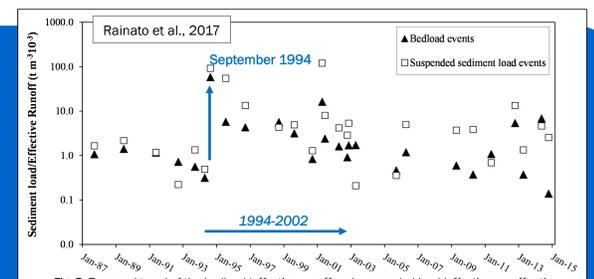


Fig. 5: Temporal trend of the bedload/effective runoff and suspended load/effective runoff ratios.