# Hydrological drivers of bedload transport in an Alpine watershed

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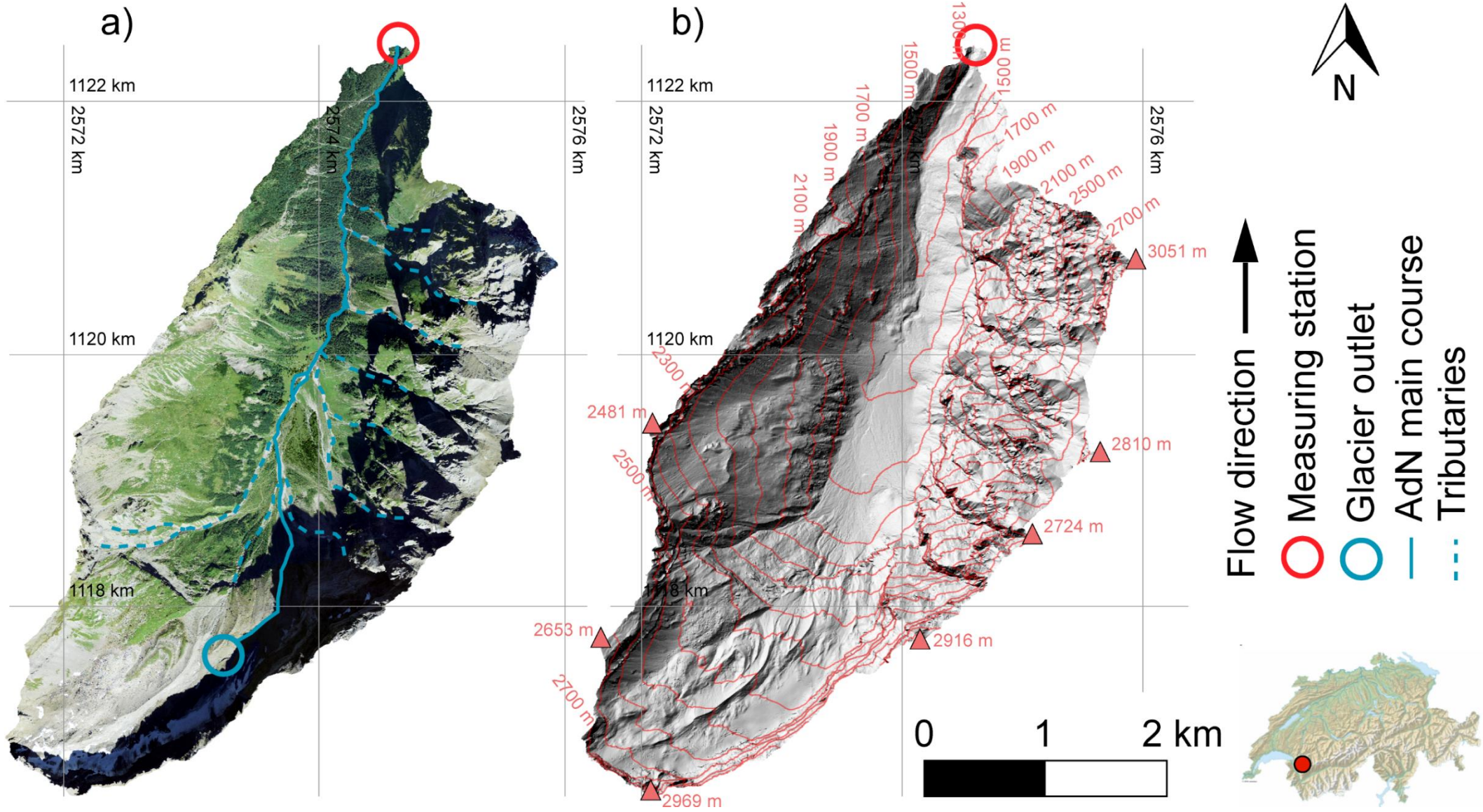
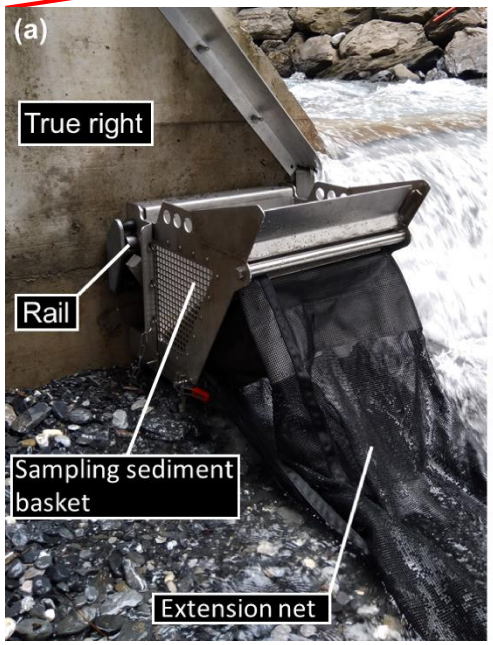
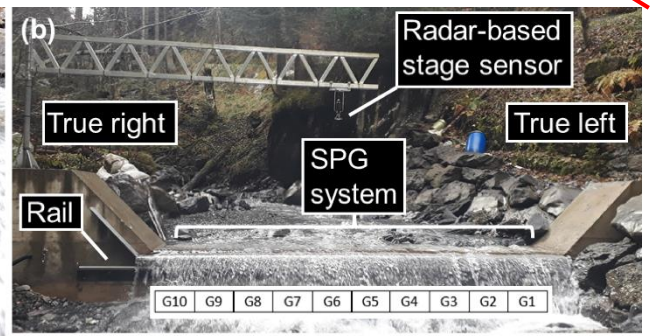
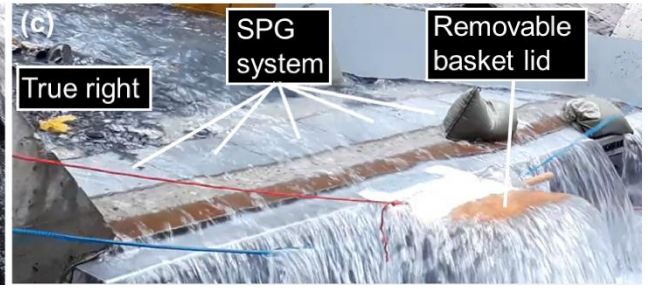
# The Vallon de Nant Alpine watershed

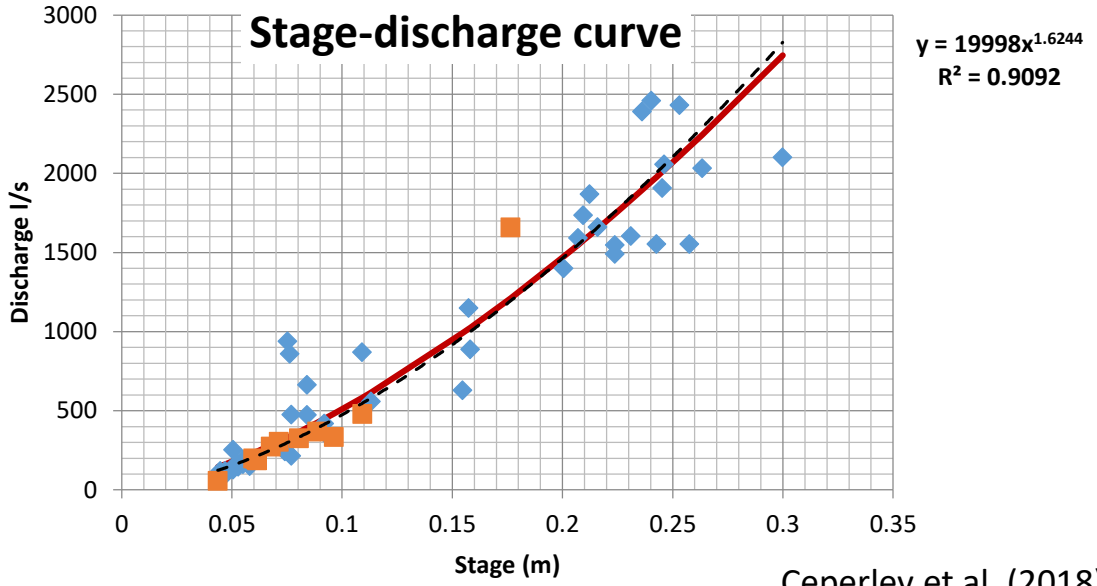


# Monitoring station – Sensor calibration

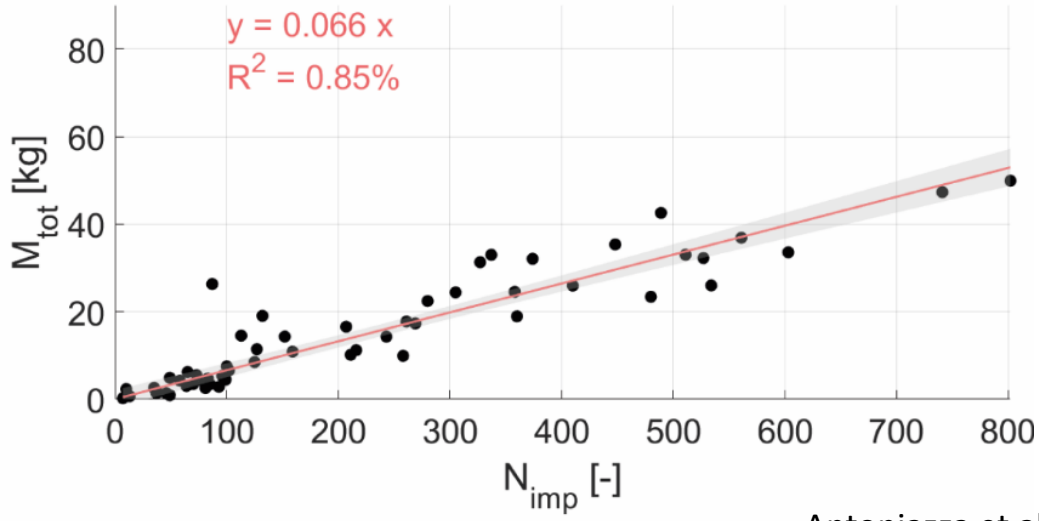


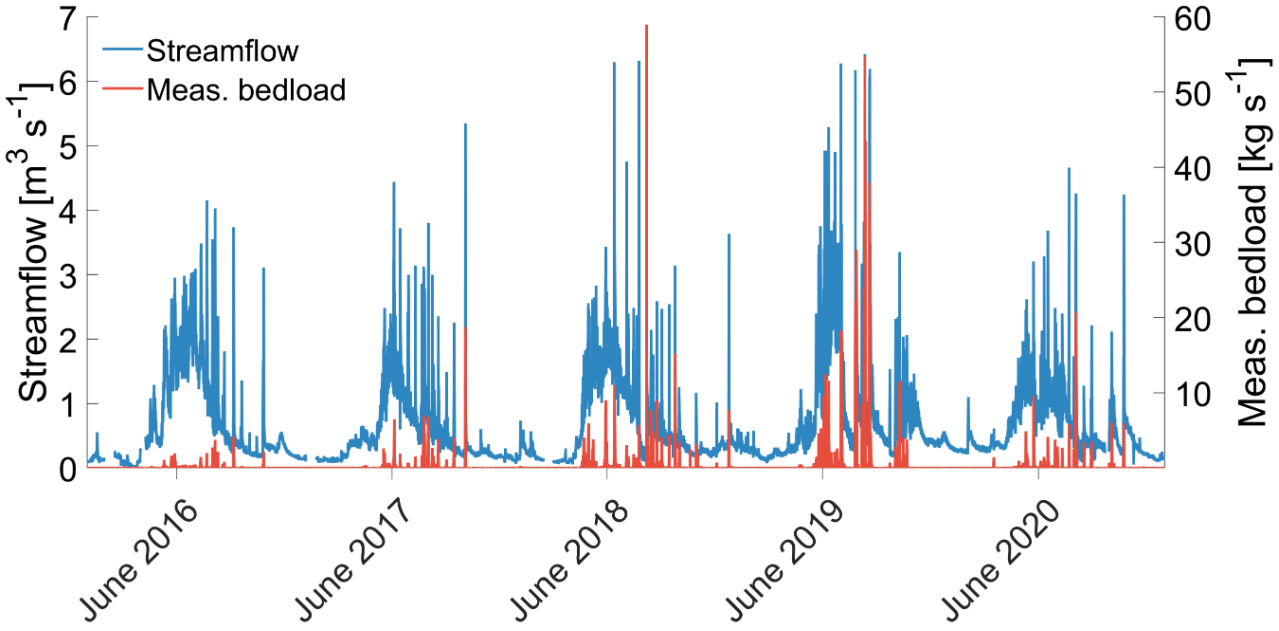




Ceperley et al. (2018)




Antoniazza et al. (2022)

# Water and bedload discharge time-series




A two-folds classification of daily flow hydrographs:

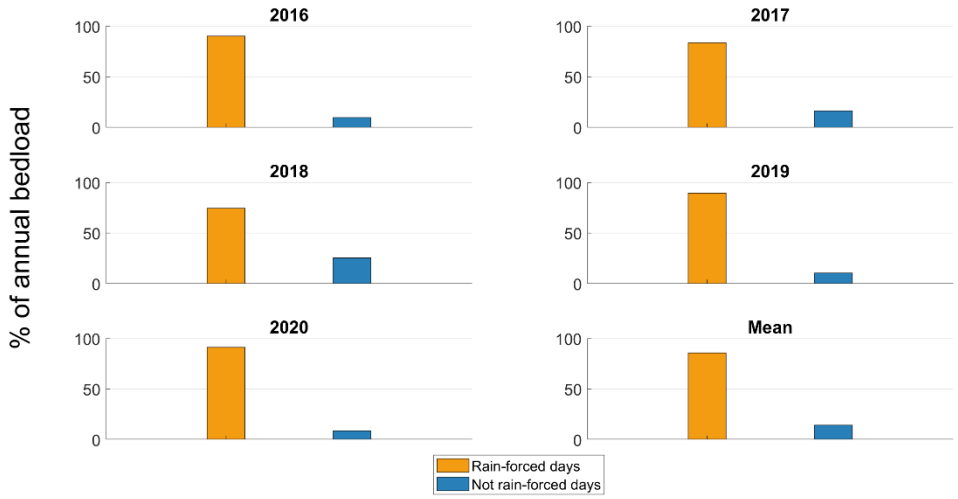
(1) Rain-forced / Not rain-forced

- Precipitation
- Temperature
- Hydrograph form

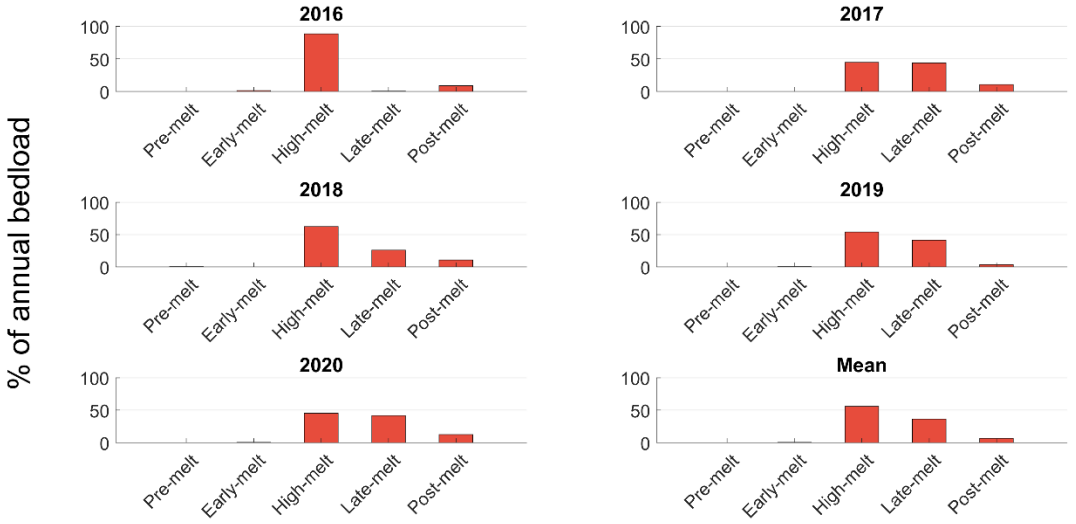
(2) Melt intensity

- Amplitude of diurnal melt cycle (Muntzner et al. 2015, WRR)
- Pre-melt / Early-melt / High-melt / Late-melt / Post-melt

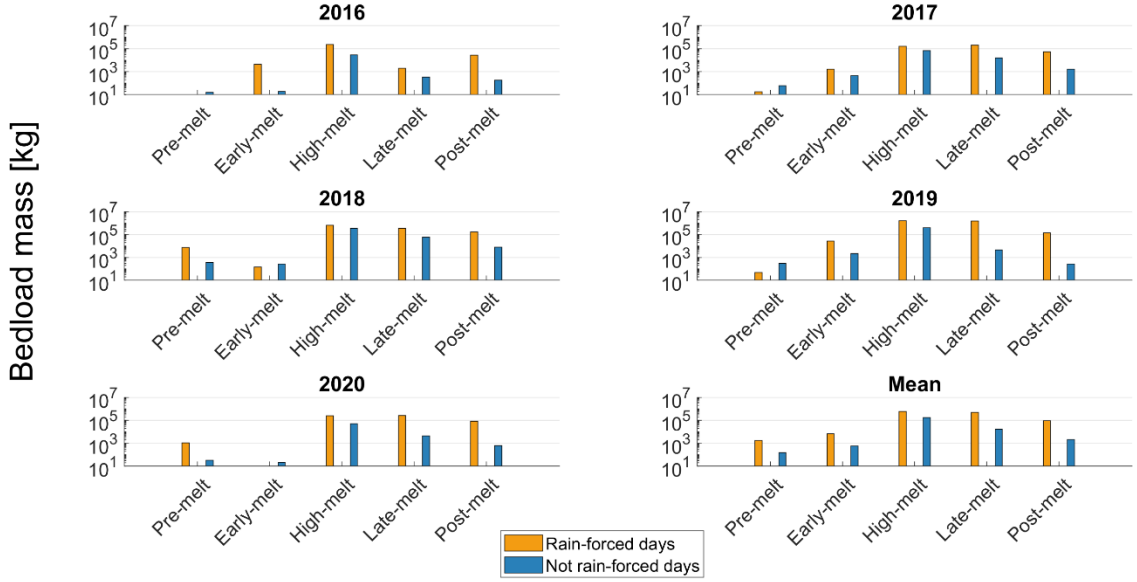
# Hydrological drivers of bedload transport




- 86 % of annual bedload → Rain-forced days
- 14% of annual bedload → Not rain-forced days



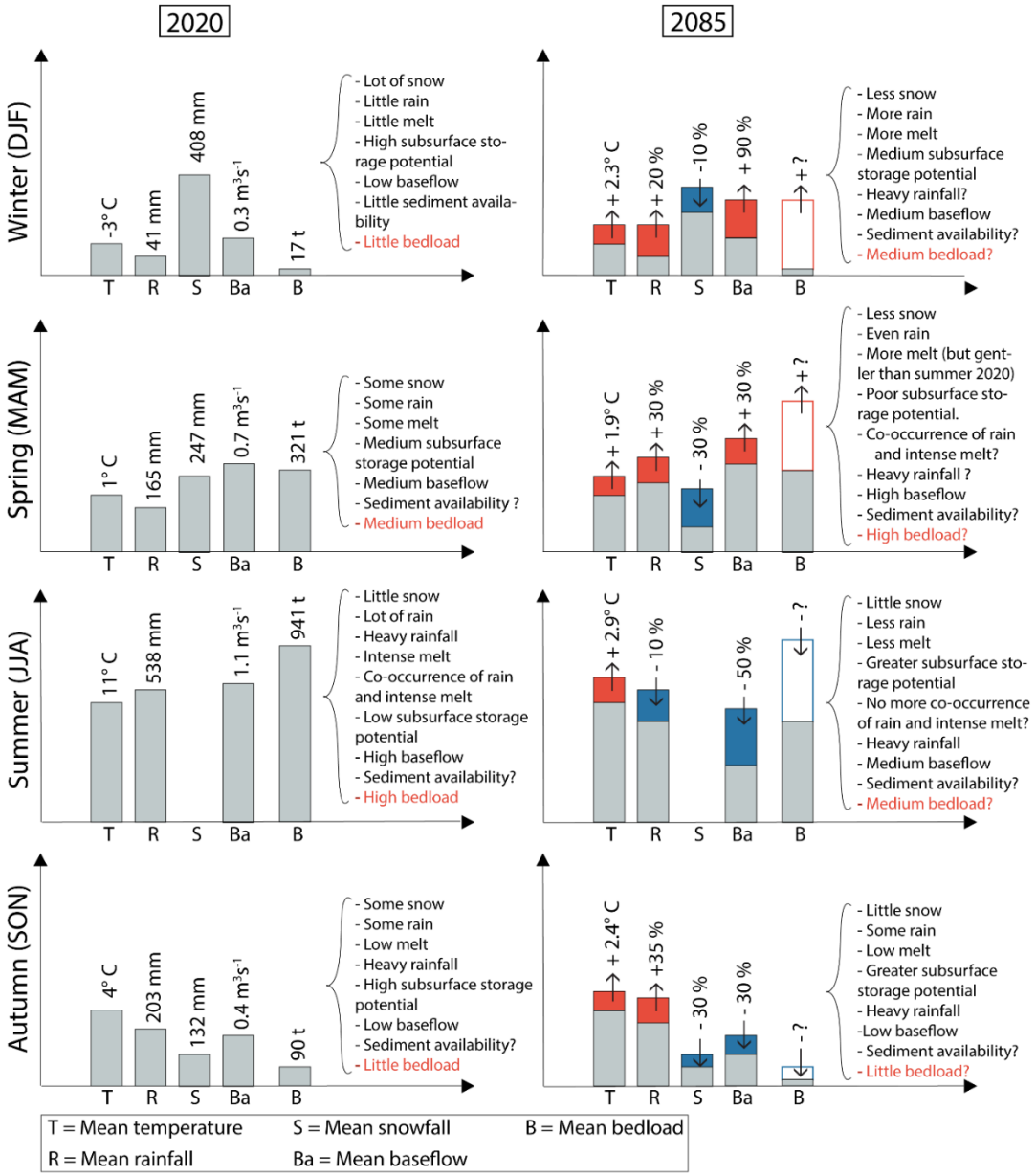

- 59 % of annual bedload → High-melt
- 31% of annual bedload → Late-melt
- 9% of annual bedload → Post-melt
- 1% of annual bedload → Pre-melt and Post-melt




- 47 % : Rain-forced & High-melt
- 30 % : Rain-forced & Late-melt
- 12 % : Not rain-forced & High-melt
- 9 % : Rain-forced & Post-melt

77 % of annual bedload → co-occurence of rainfall with a strong melt signal (i.e. high baseflow)

# Evolution with climate change?




**Key-points**

- Possible increase in bedload transport in winter and spring
- Possible decrease in summer and autumn
- Still a co-occurrence of high-melt rate with heavy summer rainfall?
- Magnitude and temporality of extreme rainfall events?

Antoniazza, G. et al. (2022). Hydrological drivers of bedload transport in an Alpine watershed. *Water resources research*, *58*(3), e2021WR030663.

# Thank you for attending!