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Supplement of

Seismic analysis of bedload discharge at Tagliamento River during flood events

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Content of this file

Figure S1 to S5

Introduction

This supporting information provides additional illustrations of the analyses performed in this work.

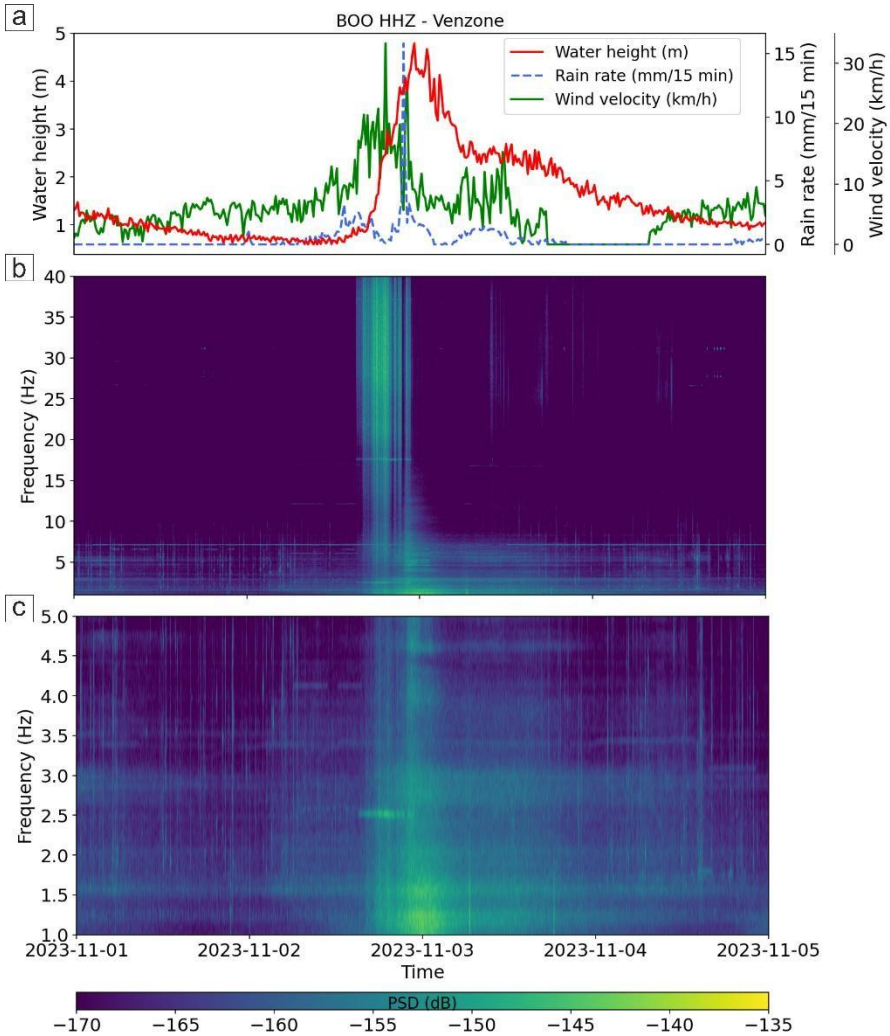

Figure S1: Spectrogram of the vertical component of the seismic signal recorded by BOO during the 2 November 2023 flood event that occurred in Friuli, in the b) 1-40 Hz and c) 1-5 Hz frequency bands. Water height (red line), rain rate (blue dashed line) and wind velocity (green line) data, shown on plot a), are collected with a frequency of a sample every 15 minutes.

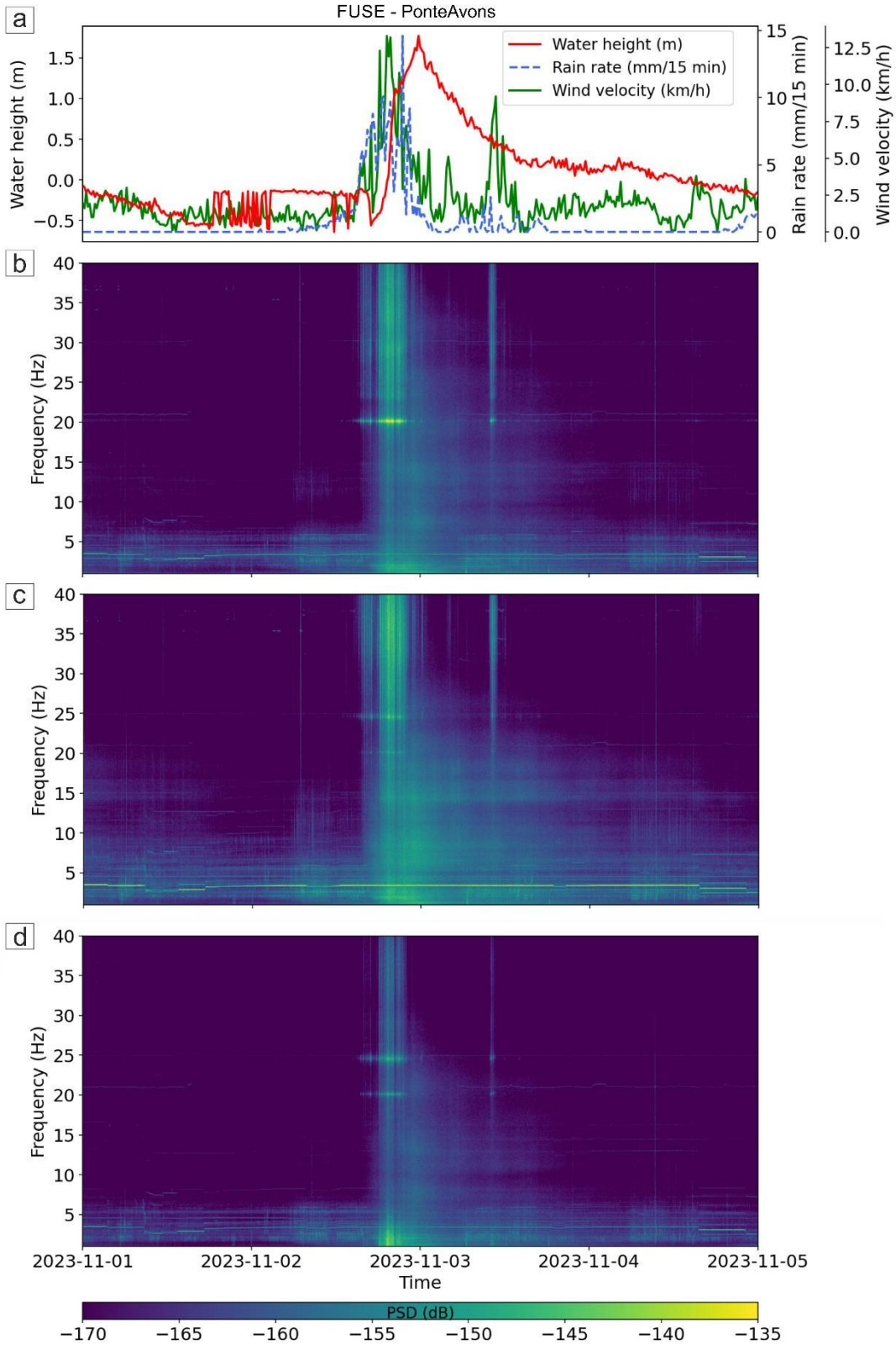

Figure S2: Spectrograms of the North (b), East (c) and Vertical (d) components of the seismic signal recorded by FUSE during the 2 November 2023 flood event that occurred in Friuli, in the 1-40 Hz frequency band. Water

height (red line), rain rate (blue dashed line) and wind velocity (green line) data, shown on plot a), are collected with a frequency of a sample every 15 minutes.

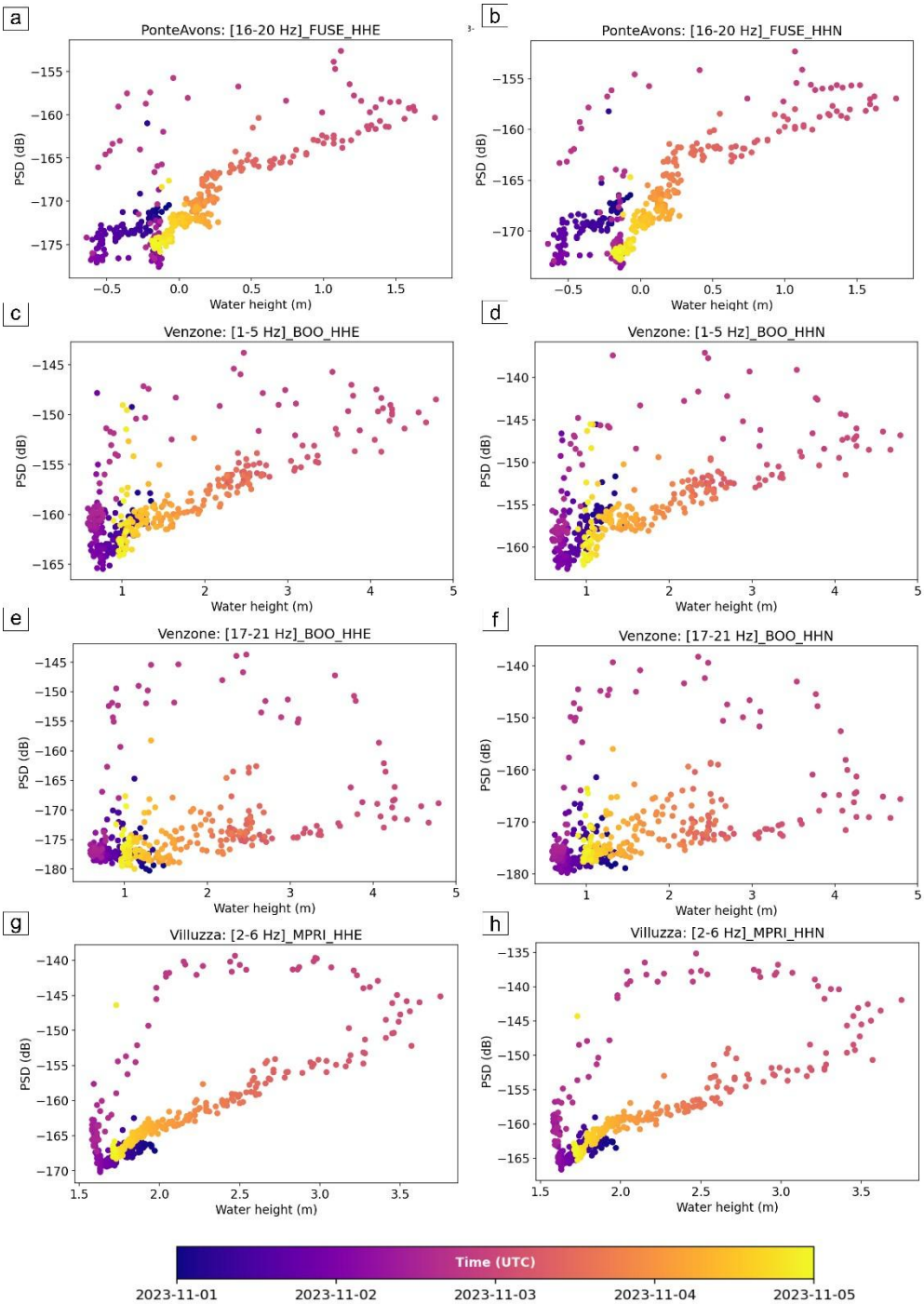

Figure S3: PSD related to the water level in the range of time (shown as colour palette, from 1 to 5 November 2023) in horizontal components for the FUSE (a-b), BOO (c-d-e-f) and MPRI (g-h) stations in most correlated frequency bands with the water height data during the flood event.

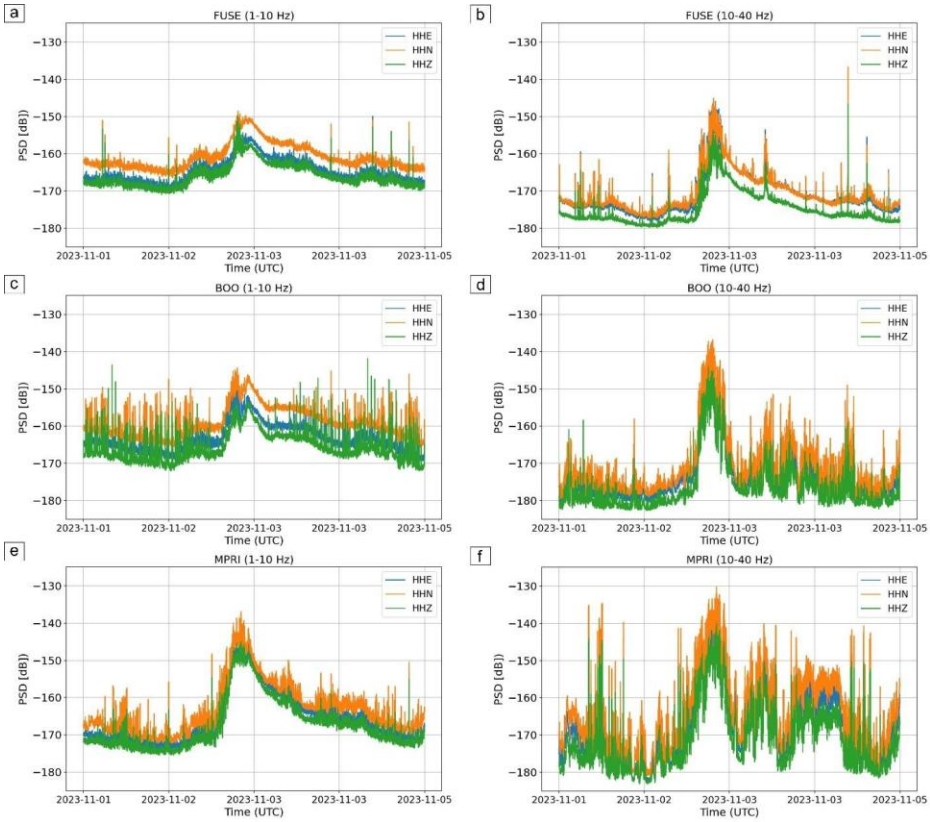

Figure S4: PSD median calculated with a 40 s window and 50% overlap on high (10-40 Hz) and low (1-10 Hz) frequencies PSD values for FUSE (a-b), BOO (c-d) and MPRI (e-f) stations. Plots clearly show the horizontal components (blue for East and orange for North) seismic energy predominance on vertical one (in green). Maximum values of PSD increase from FUSE to MPRI station, with a difference of about 10 dB for each station.

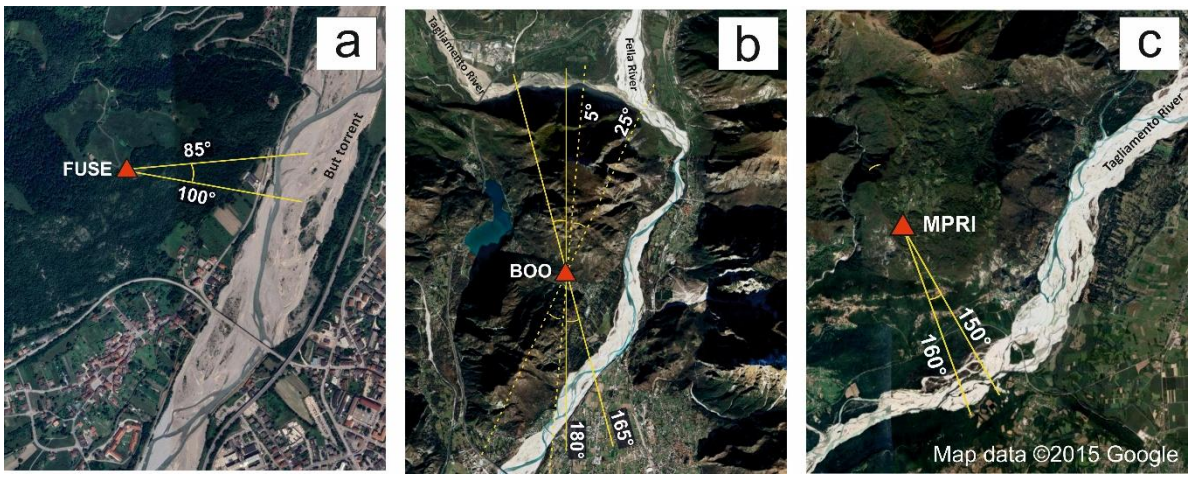

Figure S5: Satellite map showing for the three stations used (a) FUSE, (b) BOO and (c) MPRI with back azimuth values obtained from polarization analysis, displayed with yellow lines. It is worth noting that figure (b) for the BOO seismic station presents continuous yellow lines for back azimuth related to seismic data processed in the 1-5 Hz frequency range, while dashed yellow lines for 17-21 Hz frequency range. The satellite map was uploaded from Google Earth on QGIS, while stations location and azimuth angles were added successively by the authors.