



## **Seismic signature of a Réunion Island river flooding during the tropical cyclone Dumazile (March 2018)**

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Tropical cyclones can generate huge precipitation leading to flash floods in coastal and island areas. The consequences for infrastructures and populations can be dramatic as large amounts of sediments are transported downstream. The ReNovRisk project aims studying the erosion and sediment transport in flooding rivers of La Réunion Island in the Indian Ocean during tropical cyclones. In this frame, we analysed recordings made at three seismic stations installed along a river in the Salazie Basin on the northern side of La Réunion Island, together with hydrological and meteorological data to characterize microseismic noise during the tropical cyclone Dumazile (March, 2018). We evidenced a very good correlation ( $r^2 \sim 0.9$ ) between the seismic noise amplitude and the water level, particularly during the rising limb of the river flood at high frequencies ( $>1$  Hz). We also observe a clear influence of the station distance to the river on the noise amplitude, with strong noise attenuation with distance, particularly at high frequency, suggesting that the sediment transport monitoring has to be performed by stations located very close to the riverbed. We evidence a clockwise hysteresis between the power spectral density and the water level in both low and high frequency ranges dominated by water turbulence and sediment transport, respectively. Polarization measurements performed in multiple frequency ranges show an overall weak polarization, suggesting that the noise sources generated by the flooding river are not focused in the single point but instead, that the whole riverbed is emitting noise that reach the station from numerous backazimuths.