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Brumadinho tailings dam failure through the USP Seismological Center perspective

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Abstract

A tailings dam at an iron ore mine in Brumadinho, SE Brazil, suffered a catastrophic failure on 25 January 2019. The collapsed dam released mudflow down the Córrego do Feijão resulting in more than 80 fatalities and more than 200 people missing.

The dam failure happened three years after the Fundão dam disaster near Mariana. At that time, a small-magnitude seismic sequence preceded the accident and was recorded by the Brazilian Seismographic Network (RSBR). The Seismological Center suggested that the small earthquakes could have been a contributing factor for the dam collapse (Detzel et al. 2016). This hypothesis was discarded by an international expert review panel.

Probably because of this earlier experience, there were many news (in the internet and even in major newspapers) suggesting that Brumadinho Dam also collapsed because of small earthquakes. However, no evidence of natural earthquakes near Brumadinho was found. RSBR seismograms showed a different thing: the seismic signals generated by the mudflow recorded on RSBR stations located up to 200 km away and over 5 minutes long, contributing to a better analysis of the aspect of the accident.

There was no natural events that preceded the arrival of the mudflow noise in our stations. We will present polarization analyses of the mudflow noise to confirm its origin and mode of propagation.

Brazilian authorities and the mine company are working to determine the causes of the dam failure. From a seismological point of view, earthquake related causes are discarded. The seismological contributions to natural disasters like this one could justify a seismic network in Brazil and proper funding to maintain and improve RSBR. Running the Brazilian Seismographic Network is important not only to detect and study natural earthquakes but also to contribute to studies of other uncommon types of events.

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