

## **Flood Wave Propagation Caused by a Tailing Dam Failure Fundão Dam Case, Brazil**

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**Abstract.** On November 5th of 2015, the failure of the Fundão Tailings Dam, located in the town of Mariana in the State of Minas Gerais, Brazil, in the Doce River Basin resulted in an unprecedented environmental disaster in the country. The Doce River Basin is located in the Brazil Southeast region, with a drainage area of 86,7 km<sup>2</sup>. The main water course runs about 880 km until it reaches the Atlantic Ocean, passing for 225 towns with a population of approximately 3.6 million of inhabitants. The failure of the Fundão Tailings Dam and the overtopping of Santarém Tailings Dam in Mariana, state of Minas Gerais, released an estimated volume of 34 million cubic meters of mine waste, water and materials used in its construction, causing many socioeconomic and environmental impacts in the Doce River Basin. The floodwave traveled almost 80 km in the Gualaxo do Norte and Carmo Rivers until it reaches the Doce River. Then, through the Doce River it ran for 650 km until reached the ocean. The town of Bento Rodrigues, with 600 inhabitants and located about 5 km downstream of the Santarem Dam was covered by the mud and debris, resulting in 18 casualties. Immediately after the accident of the Fundão Dam, the Company of Mineral Resources and the National Water Agency in Brazil conducted flow and sediment measurements at 10 points along the Doce River, as reported by the Brazilian Company of Mineral Resources. The publication of such data provides a great opportunity for analysis for floodwave propagations in rivers caused by ruptures of tailings dams. One of the major findings is the form of the hysteresis for the suspended sediment. The hysteresis curve showed an anticlockwise loop, where the peak sediment concentration lags the peak discharge.