

EGU21-14713

<https://doi.org/10.5194/egusphere-egu21-14713>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Concentration and velocity measurements in experimental turbidity currents

Patricia Buffon^{1,2}, Daniel Valero¹, Wim Uijttewaal², and Mário Franca^{1,2}

¹Water Resources and Ecosystems Department, IHE Delft - Institute for Water Education, Delft, Netherlands

²Hydraulic Engineering Department, TU Delft - Delft University of Technology, Delft, Netherlands

Turbidity currents are in the range of highly sediment concentrated flows, challenging traditional (i.e. optical and acoustic) techniques that aim to measure concentration and velocity quantities. In typical laboratory conditions, difficulties increase in the presence of highly non-uniform and unsteady flows. However, the measurement of those quantities along with a longitudinal profile is necessary to quantify and depict key mechanisms of mass and momentum transport, related to the mean and turbulent flow fields. The possible solutions often require prohibitive costs or resources. In this work, visual, acoustic, electrical, and statistical tools are tested. The aim of these tests is to find appropriate techniques and strategies for measuring concentration and velocity quantities in the broader research scope involving turbidity currents triggered by a 2D water jet. The outcomes will be applied in the quantification of turbidity currents with various boundary and initial conditions in a flume 4 m long, 2 m deep, and 22 cm wide. Additionally, the findings can potentially be transferred to other laboratory applications involving turbidity currents or other types of sediment-laden flows.

Acknowledgements: CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, a Foundation within the Ministry of Education in Brazil), grant number 88881.174820/2018-01.