

EGU2020-17389

<https://doi.org/10.5194/egusphere-egu2020-17389>

EGU General Assembly 2020

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## Fluid mechanics of plastic debris clogging the hydraulic structures in Indonesia

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The frequent urban floods in Jakarta and Bandung, Indonesia affect the lives and livelihoods of millions of people. Floods cause damage and casualties, while climate change, unchecked development and land subsidence are worsening the problem. One factor contributing to these floods is floating debris clogging the city's drainage structures. A major proportion of floating debris consists of macro plastics which are extremely persistent in the environment. Trash racks that are clogged due to continuous accumulation of plastics in front of them can block the water flow in the river, leading to an increase in upstream water level and causing floods.

The understanding of transport and accumulation of the macro plastics in the river systems is limited as the field surveys are difficult to perform and the variety of properties of plastic debris is enormous. However, understanding of the origin, fate and pathway of plastic waste is required in order to come up with an optimal solution for plastic collection and prevention of harmful accumulation in front of the hydraulic structures. With this urge in mind field observations will be conducted on the selected river sections in Bandung and Jakarta during the monsoon season in 2020. Field observations will include the measurements of bathymetry, velocity profiles, concentrations and the characterization of floating debris, as well as identifying the accumulation hot spots of floating debris. Furthermore, experimental and numerical modelling will be performed based on the data collected during the field campaign in order to couple different debris classes to a range of riverine situations and understand the differences in their driving mechanisms.

Using a combination of field measurements, experimental modelling and empirical relations we aim to investigate the driving mechanisms of riverine plastic transport and changes in hydraulic properties due to local disturbances of the current. We will therefore link the type of hydraulic structures and the extend of obstructions due to accumulation of plastic debris to the changes in the upstream water level. This will lead to a better understanding of plastic transport in the river systems in Bandung and Jakarta, to formulate design criteria for structures in trash-laden streams and devise ways to pass trash during floods.