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# COMBINING HYDROLOGIC AND HYDRAULIC MODELS FOR REAL TIME FLOOD FORECASTING

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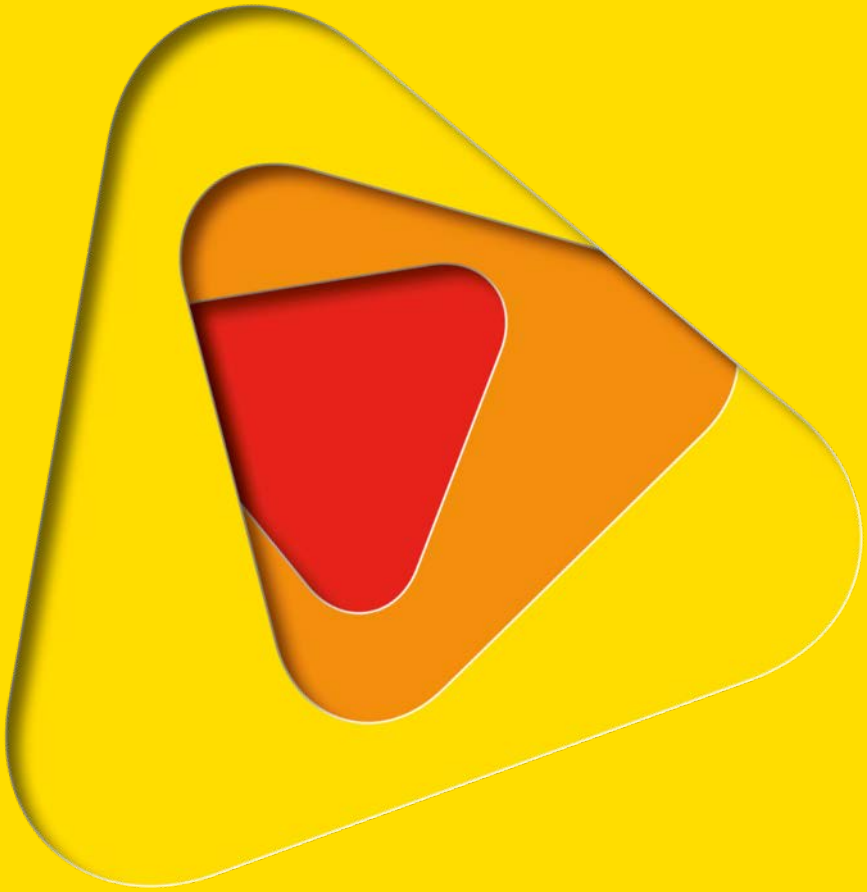

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# ABSTRACT

Floods account for approximately 40-50% of all disasters and disaster-related deaths worldwide. Although improvements in mitigation and preparedness have reduced flood-related mortality, in the last decade of the 20th century, floods still caused an estimated 100,000 deaths and affected almost 1.4 billion people worldwide. In Australia, floods are the most common natural disasters and cause the most loss of lives.

Coupled hydrologic-hydraulic models have been widely used for the modelling of design flood events in order to reduce monetary damage and increase preparedness; nevertheless an accurate and reliable flood forecast in real time is vital for giving warnings and for emergency response to reduce flood-related mortality.

In this study, a continuous hydrologic model was combined with an event-based hydraulic model to build an integrated forecasting system. In particular, the conceptual hydrologic model GRKAL was adopted to continuously model streamflow into the river system. The forecasted hydrographs were then used as inputs for the hydraulic model, LISFLOOD. The latter solves the inertial approximation of the shallow water equations to assess the extent, depth, and velocity of the flood wave in each point of the tail valley.

In order to test this coupled hydrologic-hydraulic model, forecasting experiments have been completed in a “hindcasting” scenario using historical meteorological records in two Australian catchments. The results indicated reasonable accuracy. In the next step the potential of assimilating remote sensing data and ground measurements to constrain the coupled model will be tested for achieving improved real time predictions of the spatial and temporal development of floods. The final aim of the coupled model is the provision of accurate real time predictions of the extent, depth, and velocity of the flood wave for each point of the catchment. This information will benefit the emergency response teams.