



## Joint dependence between extreme rainfall and storm surge in the coastal zone

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In the coastal zone, flooding often can be caused by two physically distinct mechanisms: ocean-derived storm tides (being the combination of storm surge and astronomical tide), and inland rainfall-derived catchment discharge. Although astronomical tides vary independently from rainfall, storm surge is governed by pressure and wind anomalies and thus can be triggered by similar meteorological conditions to those which cause intense rainfall events. The degree of interaction between rainfall and storm surge is therefore an important design parameter, with assumptions of independence or complete dependence likely to lead to under- or over-estimation, respectively, of flood quantiles in the joint probability zone.

This paper describes the extent of interaction between rainfall and storm surge around Australia, with a view to providing guidance on how these two variables should be combined to estimate flood risk in locations affected by both of these flood-producing mechanisms. The outcomes of this research show that this interaction can be detected at multiple locations along the east Australian coast line, and is influenced by factors such as storm burst duration and the lag between the extreme rainfall event and the extreme storm surge event. The issue of combining multiple inputs - each of which may or may not be extreme - to yield a single output (e.g. flood level) at a defined exceedance probability will also be discussed.