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Spatial planning using probabilistic flood maps

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Probabilistic flood maps account for uncertainty in flood inundation modelling and convey a degree of certainty in the outputs. Major sources of uncertainty include input data, topographic data, model structure, observation data and parametric uncertainty. Decision makers prefer less ambiguous information from modellers; this implies that uncertainty is suppressed to yield binary flood maps. Though, suppressing information may potentially lead to either surprise or misleading decisions. Inclusion of uncertain information in the decision making process is therefore desirable and transparent. To this end, we utilise the Prospect theory and information from a probabilistic flood map to evaluate potential decisions. Consequences related to the decisions were evaluated using flood risk analysis. Prospect theory explains how choices are made given options for which probabilities of occurrence are known and accounts for decision makers' characteristics such as loss aversion and risk seeking. Our results show that decision making is pronounced when there are high gains and loss, implying higher payoffs and penalties, therefore a higher gamble. Thus the methodology may be appropriately considered when making decisions based on uncertain information.