Flooding Risk Maps of Different Land Uses in Subsidence Area

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This study aims at flooding risk maps of different land uses in the subsidence area of southern Taiwan. Those areas are low-lying due to subsidence resulting from over-pumping groundwater for aquaculture. As a result, the flooding due to storm surges and extreme rainfall are frequent in this area and are expected more frequently in the future. The main land uses there include residence, fruit trees, and aquaculture. The risk maps of the three land uses are investigated. The risk is defined as hazard multiplying by. Vulnerability.

The factors affecting hazards of different land uses are described below. As for residence, flooding depth, duration of flooding, and the rising rate of water surface level are factors affecting its degree of hazard. High flooding depth, long duration of flooding, and the fast rising rate of water surface make residents harder to evacuate. As for fruit trees, flooding depth and duration of flooding affects its hazard most due to the root hypoxia. As for aquaculture, flooding depth affects its hazard most because the high flooding depth may cause the fish to flush out the fishing ponds. An overland flow model is used for simulations of hydraulic parameters for factors such as flooding depth, the rising rate of water surface level and duration of flooding.

The factors affecting the vulnerability of different land uses are described below. As for residence, residential area-population, vulnerable population, distance from river and seacoast, waterproofing facilities, and rescue facilities are factors affecting its degree of hazard vulnerability. As for fruit trees, the inflow of turbid fluid and warning time are the factors. As for aquaculture, inflow of turbid fluid, pond-dike type, and warning time are the factors. After finishing computing hazard and vulnerability, we can get the risk maps of different land uses in the subsidence area due to flooding.