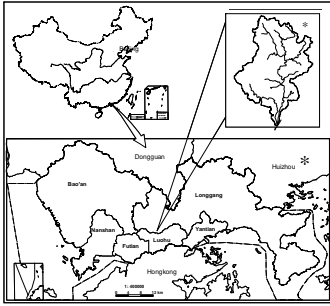


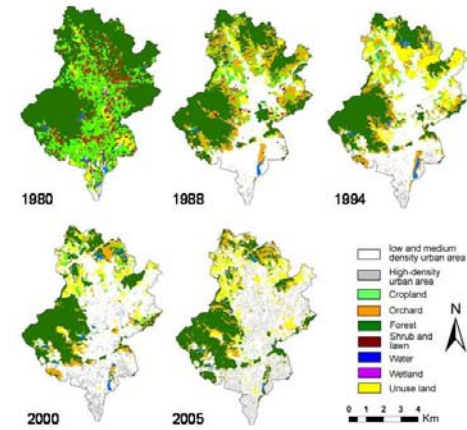
Effect of Land Policy Change on Flood Risk in Shenzhen Special Economic Region



Location of the Buji watershed

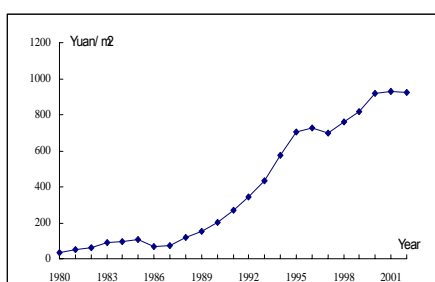
Land policy reforms

Three periods of land policy reforms (1980-1987, 1988-1993, 1994-) including Land property rights reforms, Land rent system reforms, and Land price system reforms



Land use maps of the Buji watershed (1980, 1988, 1994, 2000 and 2005)

Impact of land policy change on flood risk



Annual non-agricultural GDP per unit area of built-up area

- Situated in the south of Guangdong Province and borders on Hong Kong Special Administration Region, Shenzhen SEZ was founded in 1980 as a laboratory of reform policy and a window of opening policy.
- The Buji watershed is a typical fast urbanizing region, with more than half of its area having been transformed into urban land uses.

Methods

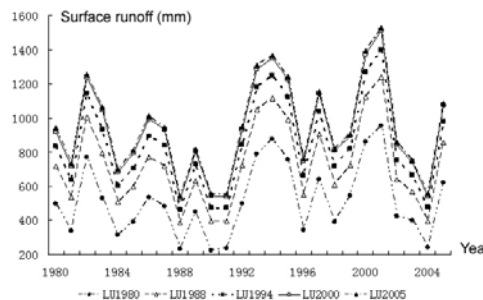
SWAT model was applied to simulate different scenarios

$$H_c = \frac{\sum_{j=1}^n \left(\frac{S_{sj}}{P_j} - \frac{S_{pj}}{P_j} \right)}{n} \quad V_i = \frac{\frac{G_i}{A_i}}{\max\left(\frac{G_1}{A_1}, \frac{G_2}{A_2}, \dots, \frac{G_n}{A_n}\right)}$$

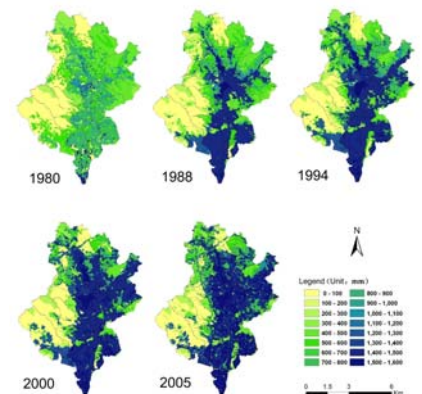
$$R_i = H_i * V_i + H_i + V_i$$

Where, V_i is the annual change of vulnerability, G_i is non-agricultural GDP of i year, and A_i is built-up area of i year; S_{sj} and S_{pj} are annual surface runoff of j year in different scenarios, P_j is annual rainfall of j year, n is the number of years between two scenarios; R_i is change of Risk, H_i is change of Hazard, and V_i is change of Vulnerability.

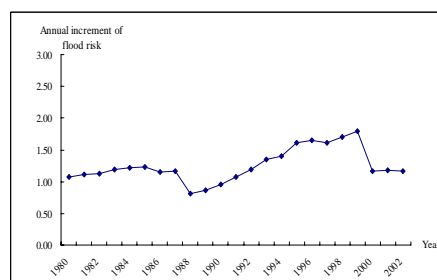
Impact of land use on surface runoff



Yearly time series 1980-2005 Surface runoff for different land use scenarios



Spatial distribution of HRUs' annual surface runoff for different land use scenarios



Annual increment of flood risk without considering change of resistant ability

- 1980 -1987, annual increment of flood risk increased slowly.
- 1988 -1993, annual increment of flood risk increased obviously.
- 1994 -, annual increment of flood risk increased slowly and began to decrease later.