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# Dynamic Assessment of the Flood Risk at Basin Scale under Simulation of Land-Use Scenarios and Spatialization Technology of Factor

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## Supplementary Figures

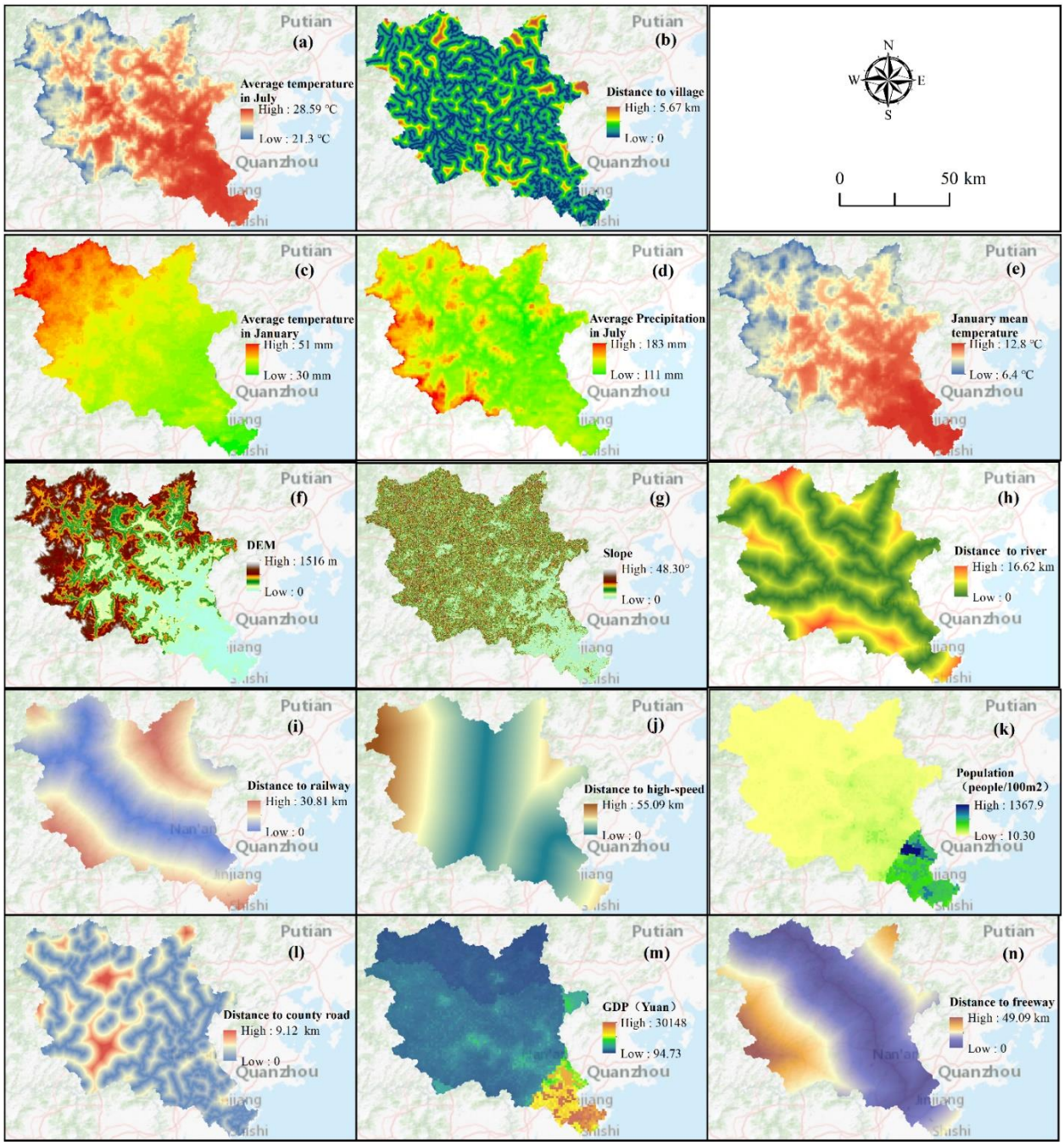


**Figure S1.** The driving factors of land-use changes. Subfigures a and b are the average temperature in July and distance to village respectively; Subfigures c–e are average temperature in January, average precipitation in July and January mean temperature respectively; Subfigures f–h are DEM, slope, and distance to river respectively; Subfigures i–k are distance to railway, distance to high-speed, and Population respectively; Subfigures l–n are distance to county road, GDP, and distance to freeway.

## Supplementary Tables

**Table S1.** The overview of data used in the future land-use simulation.

| Factor types | factors | Years | Resolution | Sources |
|---|---|---|---|---|
| Natural environment | DEM<br>Slope | 2010 | 30m | Geospatial Data Cloud (www.gscloud.cn) (accessed on: 6 May 2021) |
| | Distance to river | 2010 | 1:1,000,000 | National Flash Flood Investigation and Evaluation Project (NFFIEP) |
| | Average temperature in January<br>Average temperature in July<br>Average precipitation in January<br>Average precipitation in July | 1970-2020 | 30s | WorldClim version 2.1 (http://www.worldclim.org/) (accessed on: 20 May 2021) |
| Social economy | Population<br>GDP | 2010 | 1km | Geospatial Data Cloud (www.gscloud.cn) (accessed: 30 May 2021) |
| Geographical location | Distance to county road<br>Distance to freeway<br>Distance to railway<br>Distance to high-speed rail<br>Distance to village | 2015 | 1:1,000,000 | National Flash Flood Investigation and Evaluation Project (NFFIEP) |

**Table S2.** Parameters of disaster-inducing factors, disaster-breeding environments, and hazard-bearing bodies in the triangular fuzzy number-based AHP (TFN-AHP).

| Matrix A | Disaster-inducing factors | Disaster-breeding environments | Hazard-bearing bodies |
|---|---|---|---|
| Disaster-inducing factors | 1 | 1/4,1/2,1 | 1/3,1/2,1 |
| Disaster-breeding environments | 1,2,4 | 1 | 1/1.5,1/1.25,1 |
| Hazard-bearing bodies | 1,2,3 | 1,1.25,1.5 | 1 |

**Table S3.** Parameters of disaster-inducing factors in the triangular fuzzy number-based AHP (TFN-AHP).

| Disaster-inducing factors | M3DP | BYD |
|---|---|---|
| M3DP | 1 | 1,1.5,2 |
| BYD | 1/2,1/1.5,1 | 1 |

**Table S4.** Parameters of disaster-breeding environments in the triangular fuzzy number-based AHP (TFN-AHP).

| Disaster-breeding environments | RC | DEM | SL | DR | TWI |
|---|---|---|---|---|---|
| RC | 1 | 1.5,1/1.2,1 | 1.5,1/1.2,1 | 1 | 1,1.5,2 |
| DEM | 1, 1.2, 1.5 | 1 | 1 | 1 | 1,1.5,3 |
| SL | 1, 1.2, 1.5 | 1 | 1 | 1 | 1,1.5,3 |
| DR | 1 | 1 | 1 | 1 | 1,1.5,2 |
| TWI | 1/2,1/1.5,1 | 1/3,1/1.5,1 | 1/3,1/1.5,1 | 1/2,1/1.5,1 | 1 |

**Table S5.** Parameters of hazard-bearing bodies in the triangular fuzzy number-based AHP (TFN-AHP).

| Hazard-bearing bodies | GDP | POP |
|---|---|---|

| | | |
|---|---|---|
| GDP | 1.00 | 1/1.5, 1/1.1, 1 |
| POP | 1, 1.1, 1.5 | 1.00 |

**Table S6.** The weights of each factor determined by triangular fuzzy number-based AHP (TFN-AHP).

| M3DP | BYD | RC | DEM | SL | DR | TWI | GDR | POP |
|---|---|---|---|---|---|---|---|---|
| 0.13 | 0.07 | 0.08 | 0.10 | 0.10 | 0.09 | 0.03 | 0.17 | 0.25 |

**Table S7.** The weights of each factor determined by Criteria Importance Through Intercriteria Correlation (CRITIC).

| Years | Scenarios | M3DP | BYD | DEM | SL | DR | TWI | RC | GDR | POP |
|---|---|---|---|---|---|---|---|---|---|---|
| 2020 | \ | 0.14 | 0.12 | 0.10 | 0.10 | 0.15 | 0.07 | 0.18 | 0.10 | 0.04 |
| 2030 | NG | 0.14 | 0.12 | 0.10 | 0.10 | 0.15 | 0.07 | 0.18 | 0.10 | 0.04 |
| | EP | 0.14 | 0.12 | 0.10 | 0.10 | 0.15 | 0.07 | 0.18 | 0.10 | 0.04 |
| | CP | 0.15 | 0.12 | 0.11 | 0.10 | 0.15 | 0.07 | 0.18 | 0.09 | 0.03 |
| 2050 | NG | 0.14 | 0.12 | 0.10 | 0.10 | 0.15 | 0.07 | 0.19 | 0.10 | 0.03 |
| | EP | 0.15 | 0.12 | 0.11 | 0.10 | 0.15 | 0.07 | 0.18 | 0.09 | 0.03 |
| | CP | 0.15 | 0.12 | 0.11 | 0.10 | 0.15 | 0.07 | 0.18 | 0.09 | 0.03 |

NG, EP and CP scenarios represent natural growth scenario, and ecological protection scenario, and cropland protection scenario, respectively.