Spatiotemporal Evolution Characteristics of Urbanization in the Xiamen Special Economic Zone Based on Nighttime-Light Data from 1992 to 2020

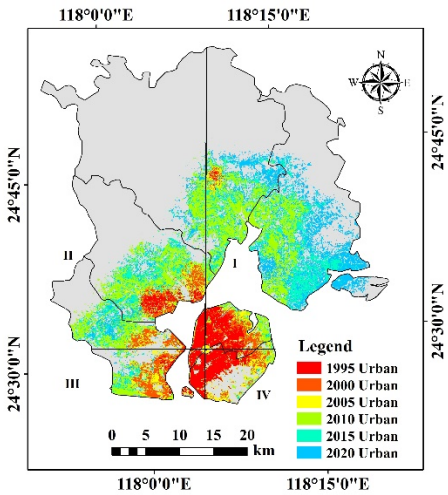
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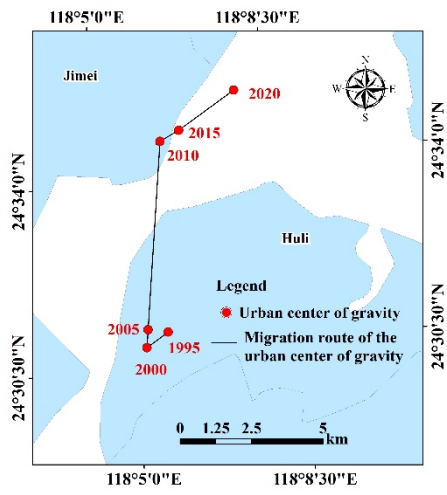
二. 成果简介：

Based on the long-time sequence NTL data from 1992 to 2020, this work studies the Xiamen Special Economic Zone by using the vegetation water-adjusted NTL urban index (VWANUI) to extract the urban built-up areas and study the urban built-up expansion patterns, the migration of the urban center of gravity, and intra-city differences. The result is a qualitative and quantitative temporal and spatial evaluation of Xiamen's economic development characteristics. In addition, the driving factors of urban expansion are discussed, and some suggestions and strategies for optimization are put forward. It is of great significance to the research on the expansion of Xiamen from an island-based to a bay-based city. The results provide data that describe urban development, which allows for an objective analysis of government policy.

三. 主要研究内容及创新点：

Based on the NTL data, we study and analyze the spatiotemporal variations in the urban development of Xiamen. (1)During the period 1995–2020, the urban spatial expansion of Xiamen was mainly centered on the inner part of the island and then expanded to the outer part of the island During the period 2005–2020, the UB accounted for 79.44% of the total urban expansion over the entire study period, indicating that Xiamen's urban expansion was primarily concentrated between 2005 and 2020 (Fig 1). (2) Over the whole study period, the urban center of gravity of the Xiamen's UB migrates 8757.15 m in the direction of 74.88° northeast, for a migration speed of 350.29 m/year. The urban center of gravity moved the fastest from 2005 to 2010, during which time it moved off the island (Fig2). (3) The total brightness of NTL in Xiamen is gradually increasing, indicating that the level of urban economic development continuously improved over the measurement period, that human social activities have strengthened, and that the cross-island development strategy has produced certain results (Fig 3).





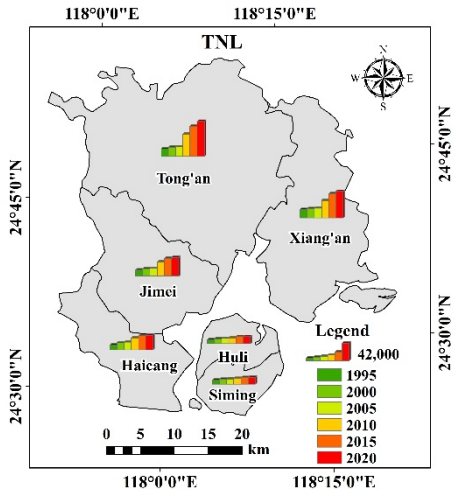


Fig 1. Expansion of UB in Xiamen. Fig 2. Location and migration route of the urban center of gravity. Fig 3. TNL of districts.

四. 主要研究成果及应用情况

1.论文《Spatiotemporal Evolution Characteristics of Urbanization in the Xiamen Special Economic Zone Based on Nighttime-Light Data from 1992 to 2020》已在《Land》期刊发表 (SSCI)；2.《Modeling and Application of Precision Surveying Instrument and Equipment》(EI 检索号：20221611992682)；3.论文《基于 NPP-VIIRS 夜光遥感的洪水灾损评估及可视化》已在《自然灾害学报》发表（CSCD）；4.申请软件著作登记 2 项、实用新型专利 1 项。

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