

# **A transition of urban compactness of Tokyo central during past 3 decades with Landsat data**

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Urban system consists of two aspects, urban efficiency and conformability. Concentration of multi and large functions of urbanized area promotes the efficiency of human works in the urbanized area while open space has given conformability to people in their urban life. Though the conformability of the urban space has been studied by various researches, the study of urban efficiency has been rare. A concept of 'compactness' seen on Zhang's paper of IGARSS2005 is a kind of measure to express urban efficiency. The compactness reaches the maximum value 2 when the urbanized area makes a circle. The value ranges from 0 to 2 theoretically when the urban area expands horizontally. Vertical urban development makes a different feature in this value variation. Supposing a case of high story building in the urban central, the value of compactness exceeds the value 2. A concept of 'compactness' seen on Zhang's paper could be modified to be applied for this three dimensional evaluation of urban efficiency. This paper gives a primitive model of urban expansion patterns taking the corresponding compactness values 0, 1, 2 and 3. Extracting a circle area with 2km radius, foot accessible area, in Tokyo central, the transition of compactness during past 3 decades is estimated from Landsat data. Value of compactness grows gradually beyond 2 in the area namely indicating the urban growing in vertical.