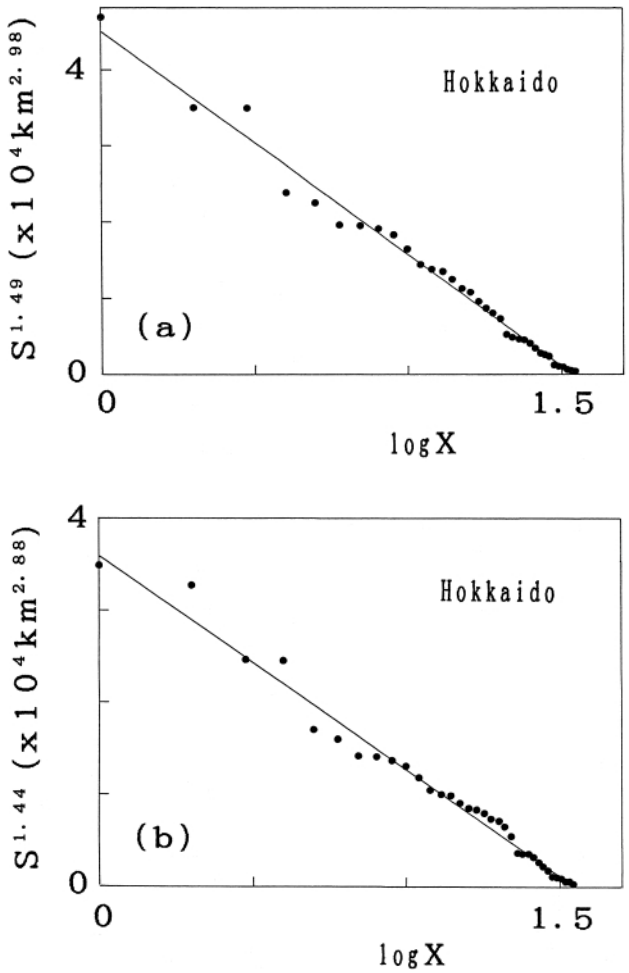

Fig. 1. Rank-ordering plot of the urban areas constituting Hokkaido. (a) Stage VI in Table 1, where $n = 35$, $(a, b) = (4.50, 2.92) \times 10^4$ km$^{2.98}$, $|r| = 0.9934$, $d = 1.917$, and $(d_L, d_U) = (1.19, 1.31)$ for level 1% Durbin-Watson test being assumed. (b) The final stage (Stage VIII) in Table 1, where $(a, b) = (3.60, 2.32) \times 10^4$ km$^{2.88}$, $|r| = 0.9909$, and $d = 1.737$; other parameters are as in (a).

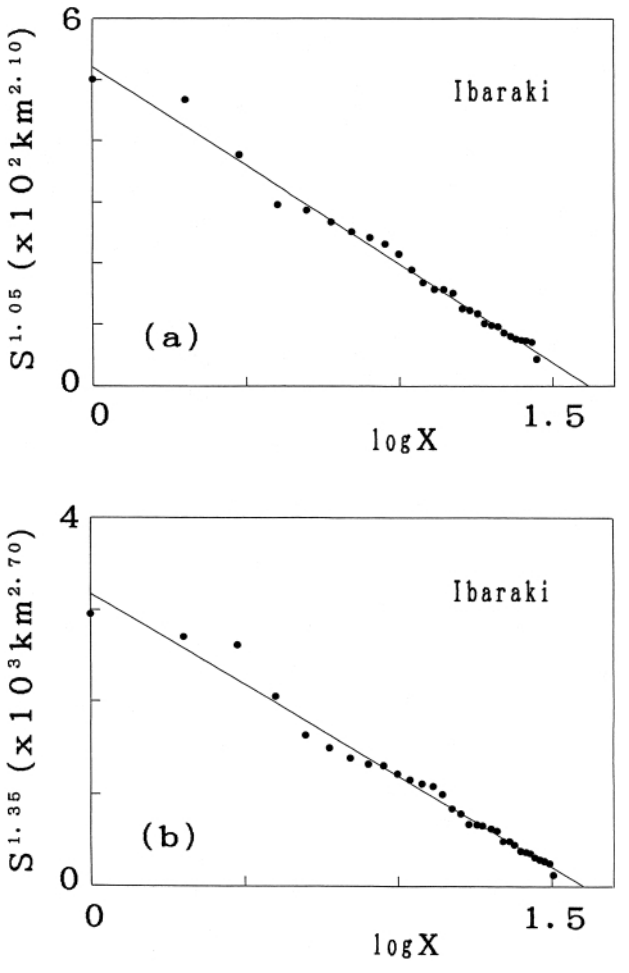

Fig. 2. Rank-ordering plot of the urban areas constituting Ibaraki Prefecture. (a) Stage XIII in Table 2, where $n = 28$, $(a, b) = (5.22, 3.22) \times 10^2$ km$^{2.10}$, $|r| = 0.9937$, $d = 1.844$, and $(d_L, d_U) = (1.10, 1.24)$ for level 1% Durbin-Watson test being assumed. (b) The final stage (Stage XX) in Table 2, where $n = 32$, $(a, b) = (3.18, 1.98) \times 10^3$ km$^{2.70}$, $|r| = 0.9908$, $d = 1.203$, and $(d_L, d_U) = (1.16, 1.28)$ for the 1% test.

source materials currently available (Yano Commemorative Association, 2005; Japan Geographic Data Center, 2006).

The results of Hokkaido, which is located at the northernmost region of Japan, are listed in Table 1. This prefecture occupies the largest area in those of Japan. Table 1 indicates that there are eight stages in the accomplishment of the entire consolidation. It can be seen from the tabularized results that throughout the entire sequence there arises no substantial variation in the numerical results, i.e., constantly $q > 1$ and $d > d_U$, which shows tolerance for perturbations due to the LSMC. As will be found in comparison between results of other prefectures, such stability could certainly be regarded as a feature unique to Hokkaido. The snapshots at Stages VI and VIII are shown in Figs. 1(a) and (b), respectively. As is seen from Table 1, Stage VI provides the best fit to Eq. (2).

The results for Ibaraki Prefecture are shown in Table 2. As is found in the table, the twenty stages are needed to finish the whole process of the LSMC. Comparison between the first (I) and the final (XX) stages indicates that the growth rate of the urban area is significant. In a series of the stages it is observable that over Stages IX–XIV the results meet the present criteria, $|r| > 0.99$ with $d > d_U$. As illustrative examples the regression results at the intermediate and the final stages, respectively, are depicted in Figs. 2(a) and (b). It should be noticed here that in the latter, $d_L < d < d_U$, signifying that for the final stage the validity of the present rank-size model is not judgeable.

In Table 2 one finds transients from the first (I) to the final (XX) stage, where nine stages contain a period within a month; in particular, Stage IX contains only six days! Indeed, in contrast to the constant growth in the number of cities (n) and in their area, throughout the transients the magnitudes of q, $|r|$, and d exhibit fluctuations. Because the municipal consolidation, in general, results from the highly political tactics among neighboring municipalities, the behavior could be regarded as being stochastic rather than being deterministic. To analyze the tactics a game theory might be useful.

The results for Saitama Prefecture are listed in Table 3. Evidently, one finds a pronounced feature of this prefecture in a number of cities coexisting in a small area. Analysis