Fig. 5. Rank-ordering plot of the urban areas constituting Fukuoka Prefecture. (a) Stage X in Table 5, where $n = 27$, $(a, b) = (45.02, 26.91)$ km$^{1.24}$, $|r| = 0.9950$, $d = 1.494$, and $(d_L, d_U) = (1.09, 1.23)$ for level 1% Durbin-Watson test being assumed. (b) Stage XI in Table 5, where $(a, b) = (56.85, 34.46)$ km$^{1.32}$, $|r| = 0.9931$, and $d = 1.174$; other parameters are as in (a). (c) The final stage (Stage XII) in Table 5, where $n = 28$, $(a, b) = (63.50, 38.25)$ km$^{1.36}$, $|r| = 0.9908$, $d = 0.949$, and $(d_L, d_U) = (1.10, 1.24)$ for the 1% test.
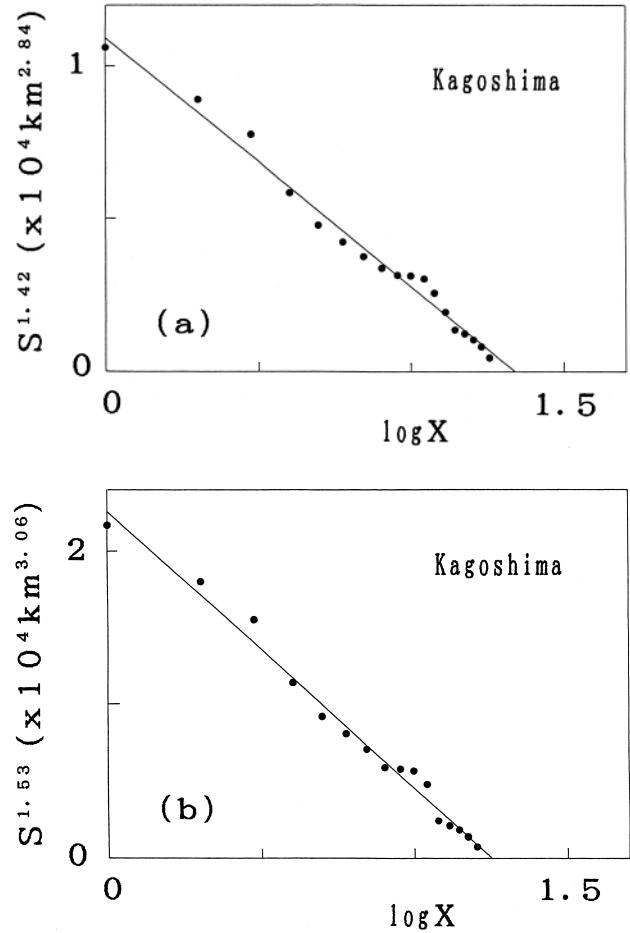

Fig. 6. Rank-ordering plot of the urban areas constituting Kagoshima Prefecture. (a) The final stage (Stage VIII) in Table 6, where $n = 18$, $(a, b) = (1.09, 0.82) \times 10^4$ km$^{2.84}$, $|r| = 0.9927$, $d = 0.975$, and $(d_L, d_U) = (0.90, 1.12)$ for level 1% Durbin-Watson test being assumed. (b) The final stage but cities on detached islands are excluded, where $n = 16$, $(a, b) = (2.26, 1.80) \times 10^4$ km$^{3.06}$, $|r| = 0.9934$, $d = 1.432$, and $(d_L, d_U) = (0.84, 1.09)$ for the 1% test.

be observed through aggregation above a certain critical density.

5. Conclusion

Effects of the large-scale municipal consolidation (LSMC) on a statistical property of urban areas in Japanese prefectures have been analyzed through rank-ordering statistics of the area data of cities coexisting in the areas. The validity of a rank-size regression model has been tested by means of a correlation analysis with the Durbin-Watson ratio. The analytical results have shown quantitatively that a series of the exceedingly rapid consolidations, most of which appear far from spontaneous, have dealt a deathblow to an organized structure that would emerge through a long-term competitive coexistence among neighboring cities.

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themselves (not cities) in the whole of Japan ($n = 47$). The conclusion is that none of them exhibits the rank-size rule as is expressible by Eq. (2), indicating that for forming the organized whole the aggregation of elements in a limited domain is necessary. This property being confirmed for the urban system might bear some analogy, for instance, to the molecular systems, where curious physical properties could