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A spatial co-located event sets is a set of spatial events being frequently observed together in nearby geographic space. Spatial co-location patterns can give useful information in many application domains such as business, ecology, public health and criminology. For example, mobile service provider might be interested in co-located event patterns to provide location-sensitive advertisements and recommendations. A common framework for mining spatial co-location patterns employs a level-wised search method (like Apriori) to discover and generate redundant co-located event sets by searching all 2^l of subsets of each length l event set since they too must be co-location patterns that must be included in the final result set. In addition, many spatial mining frameworks employ a user-defined threshold to filter interesting event sets. It can be difficult to define an appropriate user-defined threshold without prior knowledge of the data mining task. To address these problems, we propose an algorithm for mining top-k closed co-located event sets patterns, where k is the desired number of patterns, and develop an algorithm to efficiently find the interesting patterns. The experiment result shows that the proposed algorithm is effective in computation.