Spatial Clump Analysis of Multiple Geoscience Data around Geological Features using GIS: An Experimental Study

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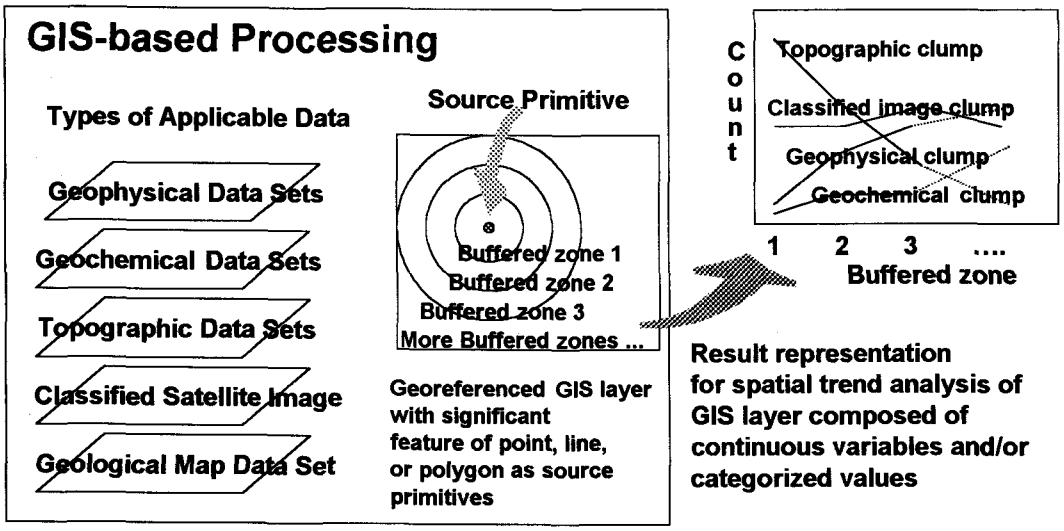
GIS(Geographic Information System) has been regarded as one of important tools or methodologies for various geoscience applications. As for the GIS field, it now emphases on specialized or site-specific GIS analysis scheme or methodology towards target applications added on spatial data manipulation and management functionality within spatial database. In this study, new simple approach named spatial clump analysis, related to GIS analytical aspect, is addressed. Among hundreds of built-in GIS analysis functions, cell-based buffering and/or proximity analysis are widely utilized at general site planning or suitability analysis task using GIS, but it is rarely extended to scientific approaches. This study is based on rationale that spatial geological pattern around primitives such as point, line, polygon standing for significant geological features can be efficiently utilized to delineate complex geological behaviors, especially handling multiple data sets of multi-sources or different background. This idea can be summarized as below.



Experiment study of this proposed scheme is also presented by using multiple geoscientific data sets, 15 types, the Ogdong area, in this study. As for geophysical and geochemical data sets, airborne surveyed data composed of magnetic anomaly and radiometric anomaly and ground surveyed data of Pb, Zn, Cu and so forth were used respectively, While, topographic data sets are DEM-driven slope/aspect map sets, and remote sensed data sets are Landsat TM imagery. Geological map, one of important data sets, is also fully geo-registed in to GIS with geometric features and their database attributes. As a result, several points in this proposed methodology when applied need to be discussed: selection problems of representative value of each data layer within buffered zones and its uncertainty or accuracy level, limitation of cell-based geo-processing, and mis-understanding problems according to intrinsically complex interactions between used data. Nevertheless, this proposed scheme shows possibilities to further extended approaches, handling other types of geo-features because it is helpful to analyze spatially clumped pattern of multiple data oriented to given sources, and is expected to effectively utilize for exploratory analysis to quantitatively find out appropriate merged model of spatial data in consideration to data sets of geoscience field and those of other fields simultaneously, although this kind of example is not currently presented in this study.