

Spatial analysis based chemical risk hotspot detection for major cities in South Korea

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Abstract: Along with the rapid development of industry and increasing in people's demand for material, chemicals, as indispensable materials, has penetrated most fields (such as medical and agricultural fields) of human society. The chemical industry has become one of the major industries driving the Korean economy since the 1960s. However, increasing in the use of chemical accompany with obsolete equipment and careless management promoted the occurrence of chemical accidents and the toxicity and flammability of chemicals pose significant risks to human health and surrounding environment become a bottleneck for the chemical industrial development. Thus, in order to reduce the human injury and economic losses, it is necessary to detect chemical risk hotspot for carrying out rational planning to minimize losses caused by possible accidents. For doing this, this study proposed a geographical information system (GIS) and remote sensing (RS) based methodology for mapping risk hotspot of the Ulsan city, Korea. Considering the causes and effects of the accident, the analysis implemented by four categories from a physical and social perspective: source of pollution (chemical plants and accidents), facilitator of pollution (wind speed and land surface temperature) receptor (population and residential area) and coping ability (distance to nearest hospital, fire station and main road). The results of this study expected to provide a scientific basis to enhance the spatial perception of the risk and make a reasonable regional planning in major cities in South Korea on chemical risk prevention support the development of the chemical industry.

Keywords: geographical information system, remote sensing, chemical risk mapping, spatial analysis.

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