Spatial Statistics
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Definition: A distinction may be made between spatial statistics and statistics in general. The most obvious difference is that spatial statistics are used to analyze data which have a spatial location. Spatial statistics give explicit consideration to spatial properties such as location, spatial patterns, spatial arrangement, distance, etc. This spatial dimension tends to make spatial statistics more complex than ordinary non-spatial statistics.

Spatial statistics has its origin in the mining industry in the early fifties. The mining engineer Krige and the statistician Sichel made the first steps in South Africa. In the late fifties Matheron adopted the concepts of Krige and developed them into a separate field of statistics.

First spatial statistics was only used for solving ore reserve estimation problems but then in the seventies with the advent of high-speed computers it spread into wider areas of earth sciences. Nowadays it is popular in many fields of science and industry where there is a need for evaluating spatially or temporally correlated data.

Application:

In areas such as ecology, epidemiology, geology, and image processing, it is not often possible (nor always appropriate) to randomize, block, and replicate the data. There is a need for flexible statistical models that address questions arising from old and new technologies. Many of these questions, such as in resource assessment, environmental monitoring (e.g., for global warming), and medical imaging, are spatial in nature. We suggest that (Bayesian) hierarchical statistical analysis will play a prominent role in solving these problems.

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