

GEOGRAPHICAL CONCEPTS

Adapted from Liebenberg and Vlok 2000, The interpretation of maps, aerial photographs and satellite images.

"Spatial phenomenon", "variable", "data" and "information"

Because maps represent geographical or spatial data, it is essential that you should understand the nature of spatial data. Before turning our attention to this, however, we need to explain four other concepts that you will encounter frequently. These concepts are geographical phenomenon, geographical variable, geographical data and geographical information. Please note that we regard the concepts "spatial" and "geographical" as synonymous, so that we could just as well speak of a spatial phenomenon, a spatial variable or spatial data and information.

A geographical or spatial phenomenon is any phenomenon in the human-environment system of which the spatial characteristics (ie location, distribution, etc) are being studied. Phenomena such as rainfall, temperature, drought, population, deforestation, urbanisation, war, famine and crime are all geographical phenomena because they occur in various places on the earth's surface.

A geographical or spatial variable is a measurable property of a geographical phenomenon which changes from place to place, and from time to time. What do we mean by this? In a general sense any spatial phenomenon such as rainfall or crime is also a variable, because it varies over both time and space. Strictly speaking, what varies is not the phenomenon (rainfall) as a whole, but rather a measurable characteristic of rainfall, such as the kind of rainfall or the quantity. It would therefore be more accurate to refer to this measurable characteristic of the phenomenon as the variable.

Let us take another two examples to make certain that you understand the difference between a phenomenon and a variable. Land is a spatial phenomenon, for example, and so is population. However, when we try to establish exactly what it is about land and population that varies from place to place and from time to time, we find that it is a measurable characteristic of land such as soil fertility, soil texture or soil type that varies rather than the phenomenon of land (or soil) itself. The last three measurable properties of land that will produce different measurements at different times throughout the world are therefore soil variables. In the case of population we would measure properties such as population density, birth rate, mortality rate, percentage of the population under the age of 16 years, percentage over the age of 60 years, etcetera. Where population as such can be regarded as the spatial phenomenon, these measurable characteristics of population are all population variables.

Another important point that you should realise at this stage is that not all data sets are numeric. What we mean by this is that although scientists usually try to express the "variability" of a variable numerically, this is not always possible. For example, a property such as "type" (soil types or vegetation types) cannot be expressed in numerical form. Surprisingly enough, this does not mean that "type" cannot be measured. Impossible? Not at all! The mental adjustment you need to make here is to grasp the fact that the results of measurement need not necessarily be expressed in figures. They can be expressed in words, in which case we refer to them as nominal data. If you find this difficult to swallow, what you should bear in mind is that this "measurement process" is based on the drawing of

distinctions rather than on measurement in the familiar sense of the word. In the case of vegetation types, we can distinguish between short grass, long grass, savannah and tropical forests, and in the case of soil types we can distinguish between clay, silt and loam.

Another important distinction to note is the difference between "data" and "information". Data refers to unprocessed facts that occur in isolation. These are facts that have not been collected in any particular order. These facts may well bear no relation to one another. Information, on the other hand, is the result obtained when data are processed in a logical manner. In the course of processing the original facts or "raw" data are placed in a particular context. The person who receives the information can use it as a basis for taking a decision.