

System

A system is an autonomous entity with regard to its environment, organised in a stable structure (identifiable in the course of time), constituted by interdependent elements, whose interactions contribute in maintaining the system structure and making it evolve.

The main epistemological contributions to the notion of system are : a circular conception of causality (retro-action loops), a breaking up of reality into organisation levels endowed with autonomy but interdependent, attention paid to relations between elements rather than to attributes of these elements.

Approach in terms of systems adds mathematical representations (system analysis, system dynamics) and simulation tools (differential equations models, multi-agents systems) to those principles already present in organicist views in the XIXth century.

Systems analysed in geography are always open systems, which maintain more or less intense and determining relationships with an environment from which it is sometimes difficult to distinguish (abstract) them. Questions that systemic approach allow to solve relate to conditions of emergence of systems structure (systemogenesis), of its continuation and survival when environment changes (resilience, bifurcations), of determination of organisation and evolution of an observation level through interactions between elements of lower level(s) (hierarchical systems, theories of self-organisation), of limits and constraints exerted by structure of a system onto its constitutive elements (contextual effects) or reciprocal determinations (multi-level analysis).

The main systems constructed by geography belong to quite different representations. The erosion system is a set of processes linking climatic, hydrologic and topographic conditions. Some systems constructions introduce spatiality in order to analyse working and evolution of a localised activity (system of the Languedoc vineyard by F. Auriac, system of mining region by G. Baudelle). Other representations build a geographic object in terms of systems (B. Berry for " cities as systems within systems of cities ", Wallenstein and F. Braudel for the world system). The notion of spatial system formulated by Ph. Pinchemel covers all expressions of spatiality through which a society organises its territory.

Mathematical or computing formalisations in which spatial interactions are explicit were set up for systems of exploitation of renewable resources (fishing, breeding or forestry models, vineyard model), in order to simulate evolution of regional systems (P. Allen, AMORAL model of the Dupont Group) or urban systems (Forrester model, models of A. Wilson or P. Allen, SIMPOP model).

Bibliographie