

## THE REVOLUTION OF THE ENVIRONMENTAL SCIENCES

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Any attempt to make an approach of the complex reality that nowadays exists in the planet Earth will necessarily show the insufficiency of the scientific disciplines. The impossibility of a correct approach of the reality, by natural and social sciences, can be found both at the theoretical and empirical levels. Since Kant, however, the great degree of freedom of the human beings is well known. Expanding this contingent possibility in a planetary scale, the action of Homo sapiens is a geological agent, as it was foreseen by Vernadsky and is well established by the Environmental Geology (quinary, anthropostrome, anthropogeology and global change). In a next higher step, humankind appears as a new force that tries to drive the universe. Taking the human freedom to act into the ideas expressed in the work of Schelling about nature, it becomes clear that reality (Wirklichkeit, in German) is under one effectuation (wirken, in German) that is the expression of cosmic and natural forces, and another one that is the human allopoietic effectuation. The first epistemological revolution was the book *The Structure of Scientific Revolutions* (Kuhn, 1962), giving a new direction to the theory of knowledge and the meaning of scientific change. The second revolution is the radical emergency of the environmental sciences set by the environmental paradigm in an epistemological level (Rohde, 1996), needing new tools which are: the use of the philosophy of effectuation by Schelling; the application of the theory of self-organization (Maturana & Varela, 1974); the articulation of the philosophical-scientific implications in a way of recurrency (contingency, reprocessuality, ethics, history and hermeneutics); a new framework for empirical sampling of environmental data and the interdisciplinarity. An environmental science takes into account the process between the natural effectuation and the human allopoietic effectuation, the interactive relations between the natural and the social (or cultural) systems.