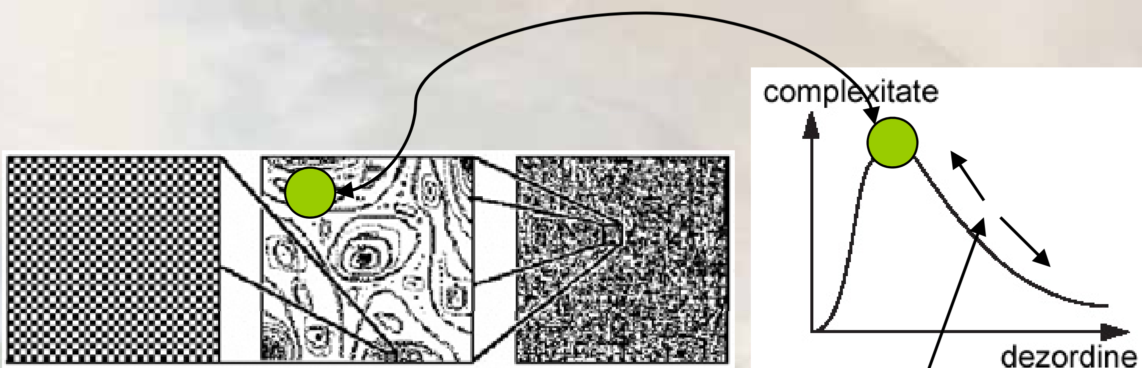
Academia Oamenilor de Ştiinţã din România

sectia: Ştiinţe Geonomice

NEVOIA UNUI SALT DE PARADIGMA

ATLANTYKRON 2009

Particularitati ale noii paradigme a Complexitatii permite studiul sistemelor disipative, vii, capabile sa actioneze inteligent si sugereaza directii noi de abordare in problematica cognitiei, a Constintei in evolutia ei de la cunoastere si intelepciune catre spiritualitate si indumnezeire.



Productia de negentropie

- De la masurarea unui parametru la … evaluarea unui pattern caracteristic
- De la modelare la simularea "genezei"
- De la cautarea invariantilor intr-o lume de flucturatii la studiul rolului flucturatiei in geneza sistemului (rolul structurant al fluctuatiilor)

Complicat vs. Complex

Un sistem **complicat** poate fi modelat si controlat; are o structura predeterminata; are o dinamica previzibila, modelabila matematic prin sisteme de ecuatii diferentiale; poate fi studiat printr-o abordare reductionista, cauzala, determinista & stochastica.

Complicat implica: linear, principiul superpozitiei, reductionism Newtonian

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Un sistem complex **co-evolueaza odata cu mediul**; este **sensibil la conditiile initiale**; prezinta procese de **auto-organizare**; poate sari de la un mod de operare la altul (**tranzitii de faza**); nu poate fi modelat prin izolare si identificare a unor relatii strict cauzale, este dependent de “istorie”, dificil de studiat intr-o abordare cauzala.

Complexitate: neliniar, evolutiv, contextual, holist, transdisciplinar

Latin word *complexus*, which signifies "entwined", "twisted together". This may be interpreted in the following way: in order to have a complex you need two or more components, which are joined in such a way that it is difficult to separate them. Similarly, the Oxford Dictionary defines something as "complex" if it is "made of (usually several) closely connected parts".

Consecinte

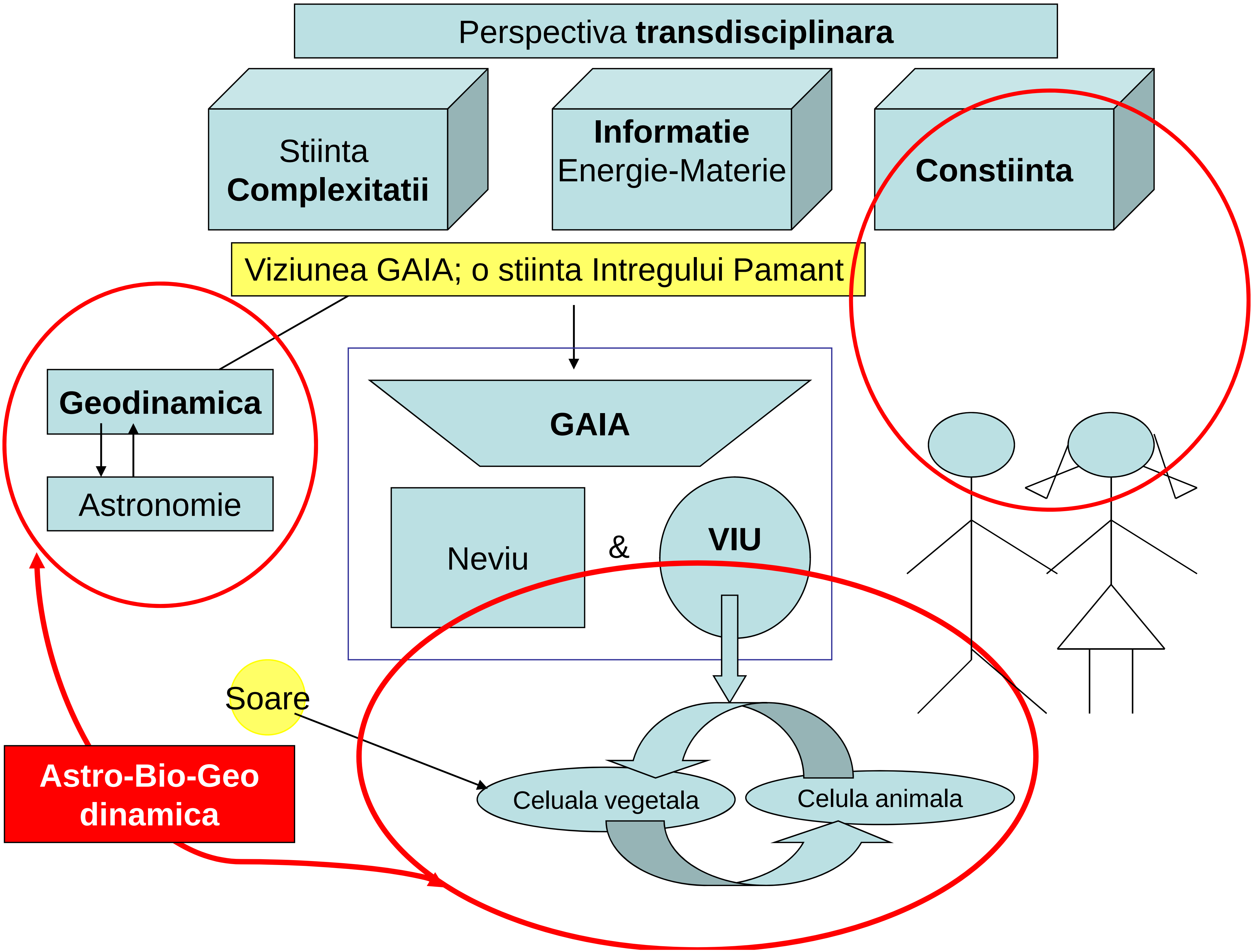
• un sistem complex nu poate fi inteles printr-o abordare reductionista

• un sistem complex este disipativ, manifesta criticalitate auto-organizata, tranzitii de faza, comportament haotic, puncte critice, bifurcatii, poate fi controlat (controlul haosului), se poate aplica conceptul de rezonanta haotica, rezonanta sochastica

• exista sisteme complexe cu constiinta (arheme si nu sisteme)

Metodologic, studiul unui sistem complex presupune

- Identificarea unor amprente (pattern) “comportamentale”
- Identificarea unor discontinuitati, puncte critice de restructurare interna
- O noua viziunea asupra abordarii experimentale, de la proiectarea contextului la modalitatea de colectare si interpretare a datelor
- Noi protocoale experimentale, specifice comportarii neliniare ale unui sistem
- Noi senzori si echipamente



Perspectiva transdisciplinara
Stiinta Complexitatii
Informatie Energie-Materie
Constiinta
Viziunea GAIA; o stiinta Intregului Pamant
Geodinamica
Astronomie
GAIA
Neviu
&
VIU
Soare
Celuala vegetala
Celula animala
Astro-Bio-Geo dinamica

Viziunea GAIA – abordare inter si transdisciplinara a Vietii intrupate

Decoherence, quantum theory and their implications for the philosophy of geomorphology

Stephan Harrison* and Philip Dunham†

Recent philosophical discussions on the nature of geomorphology (Bassett 1994; Richards 1994; Rhoads 1994) have concluded that the way forward in geomorphological explanation is through either an empiricist or a realist approach. This paper draws lessons from quantum mechanics and the related concepts of decoherence and entanglement to explore the theoretical limitations of both of these existing approaches to geomorphology. It is suggested that empiricist and realist approaches are misguided in their attempts to view the researcher as being in some way 'detached' from the reality of the environmental system under investigation.
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Sa ridicam Mintea la nivelul Complexitatii Naturii!

Sa nu simplificam si sa nu fragmentam Natura dupa interesele noastre limitate!

Florin Munteanu

Introduction

Geomorphologists have traditionally been reluctant to discuss the philosophical foundations of their discipline. As recently as 1994, Richards could state:

> . . . most geomorphologists still have little interest in deeper philosophical and theoretical issues . . . [they are] more comfortable with geomorphology itself than with any philosophical underpinning it might have. (Richards 1994, 277–8)

This state of affairs contrasts sharply with the experience of other areas of geographical enquiry (most notably within 'human' geography), where wide-ranging philosophical debate has become an integral feature of the research agenda (see, for example, Cloke *et al* 1991; Pile and Thrift 1995; Benko and Strohmayer 1997; Barnes and Gregory 1997; Peet 1998).

Nevertheless, lately, the situation in physical geography has begun to change. Several geomorphologists (Richards 1990; 1994; Bassett 1994; Rhoads 1994; Rhoads and Thorn 1996) have initiated a lively debate about the nature of geomorphology, which has explicitly considered the strengths and weaknesses of competing philosophical approaches. These authors have contested the relative merits of empiricism, positivism, critical rationalism and realism as bases for

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scientific explanation in geomorphology. This paper makes a contribution to the debate by drawing lessons from quantum theory. Specifically, it uses the main precepts of the Copenhagen Interpretation of quantum mechanics to explore the theoretical limitations of realist and empiricist approaches to geomorphology, and discusses the nature of decoherence and entanglement as potentially limiting factors in our exploration of landscape and process.

The paper is divided into three parts. In the first, we briefly outline the key characteristics of the major existing philosophical approaches to geomorphology. The second part of the paper uses concepts and ideas underlying quantum theory to show how some of the main epistemological and ontological claims associated with these existing is advanced through the collection of established or verified facts.[1] Throughout this process, the researcher assumes the role of a detached and neutral observer, gathering and analysing information in a seemingly objective and disinterested way.

Empiricist ontology envisages a reality which is directly observable to the researcher, and which is characterized by an enduring natural order. What exists is thus what is seen (and proved) to exist. The notion of an enduring natural order to the world underpins two further characteristics of the logical positivist variant of empiricism. First, it endorses the Humean conception of causation, which is based on the notion of a direct and enduring relationship between observable causal mechanisms and events. Scientific explanation

derivatives logical positivism and critical rationalism) on the one hand, and realism on the other. Of these philosophies, empiricism has been by far the most extensively applied, especially in its logical positivist incarnation. The realist approach has started to gain ground only in the last few years (eg Richards 1990; 1994; Richards *et al* 1997), and its explicit application to empirical research in geomorphology remains in its infancy.

Like all philosophies of science, empiricism and its derivatives are characterized by a particular set of epistemological and ontological claims. The former refer to an idea of knowledge and how it may be produced, whilst the latter connote an idea of being or existence. Epistemologically, empiricism (or, more correctly, its positivist derivative) contends that knowledge is gained through experience, with the proviso that this experience is verifiable. In other words, knowledge 1986). This Bhaskarian brand of realism has been developed as *critical realism* in the social sciences, where it has received serious attention from human geographers since the 1980s (eg Allen 1983; Sayer 1985; 1992; Sarre 1987; Pratt 1994; 1995; Yeung 1997). Its counterpart in the physical sciences – *transcendental realism* (hereafter referred to as realism) – has also attracted a growing number of adherents, among them geomorphologists such as Richards (1990; 1994).

Realist ontology is encapsulated in a device proposed by Bhaskar (1978). Bhaskar considers that there are three realms to reality. These are *the real* (which comprises real entities, structures and generative mechanisms), *the actual* (which comprises events) and *the empirical* (which consists of human experiences). Each of these domains is contingently (ie incidentally) related to the others. As Bhaskar explains,