

# Global Processes and Systems

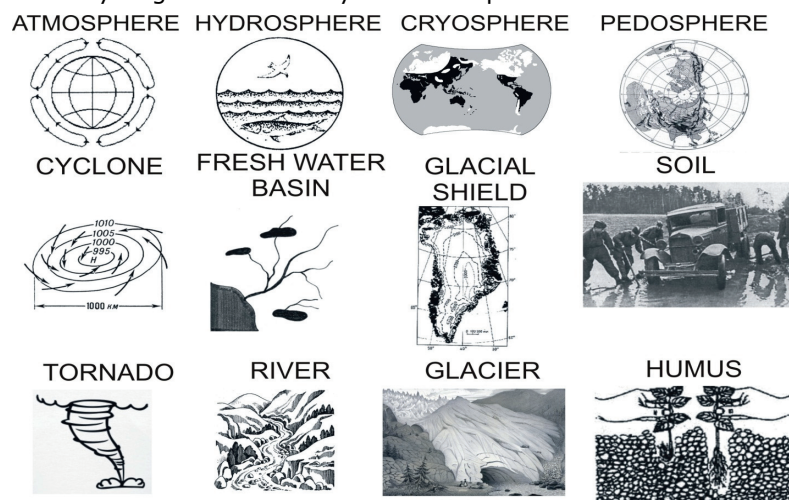
*Ilya V. Ilyin, Ruslan R. Gabdullin, and Alexey V. Ivanov<sup>1</sup>*

Global processes of the Earth are the result of its global systems' interactions, so we consider them in the aggregate. Natural processes are elements of global processes. Global natural processes exist not only on the Earth, but in outer space, for example, on primary planets. *Most of the global natural processes are identical or similar to each other on different planets* (volcanic activity, rotation of planets, atmospheric processes on Mars, Venus and so on). They have a key impact on all cosmic bodies including our planet. Origin of the Universe, the Solar System and the Earth is the subject matter of Universal and Global History / Big History. Paleo-Globalistics, in turn, is a study of evolution of the Earth, its global systems and processes in historic perspective, as well as a study of evolution of life. Interaction of cosmic bodies is explored in Astronomy and Astrophysics. Global natural processes of the Earth are one of the objects of study in Globalistics.

In our view, the Earth is a set of natural systems. Lithosphere (global geosystem) is the outer solid part of the planet. Gravitational field determines spherical form of the Earth and existence of atmosphere (global aerial system) and hydrosphere (global aquatic system). Cryosphere (global system of ice and snow) is water in frozen state. The presence of water and air has made the existence of life possible, which implies the existence of biosphere (global biosystem). Pedosphere (global soil system) is the result of life sustenance of organisms, urbosphere (global urban system) was formed by human activity.

According to hierarchical principle, every system contains subsystems – systems of lower rank (see Fig. 1).

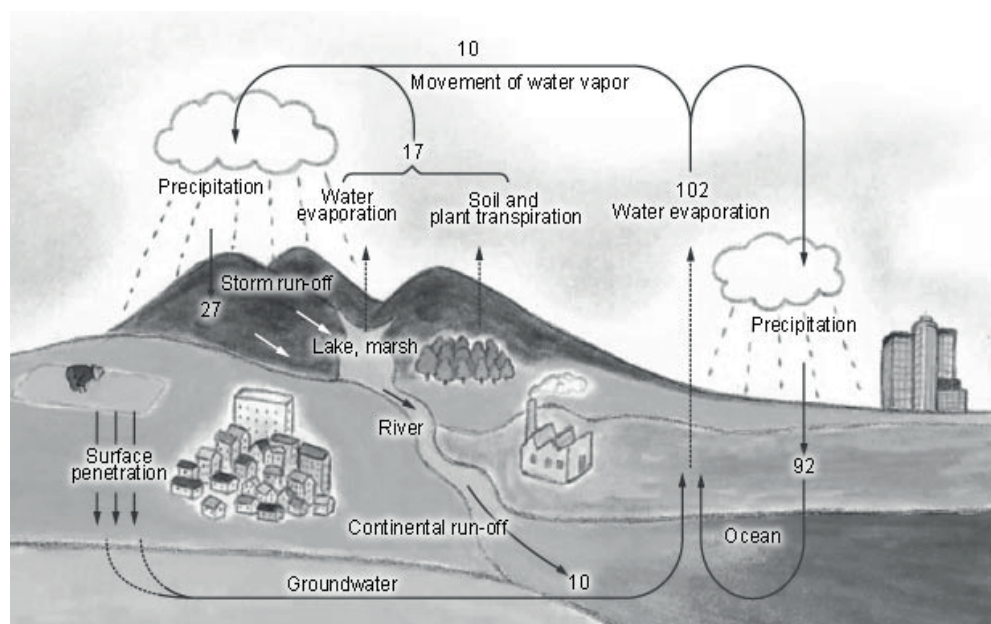
**Fig. 1.** Hierarchy of global natural systems and processes



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Global natural systems interact via global natural processes, most of them are processes of supra(inter)system rank. For instance, *water circulation as a global process exists in every system* (see Fig. 2, Tab. 1). Examples of particular global processes are presented in the lowest row of the table.

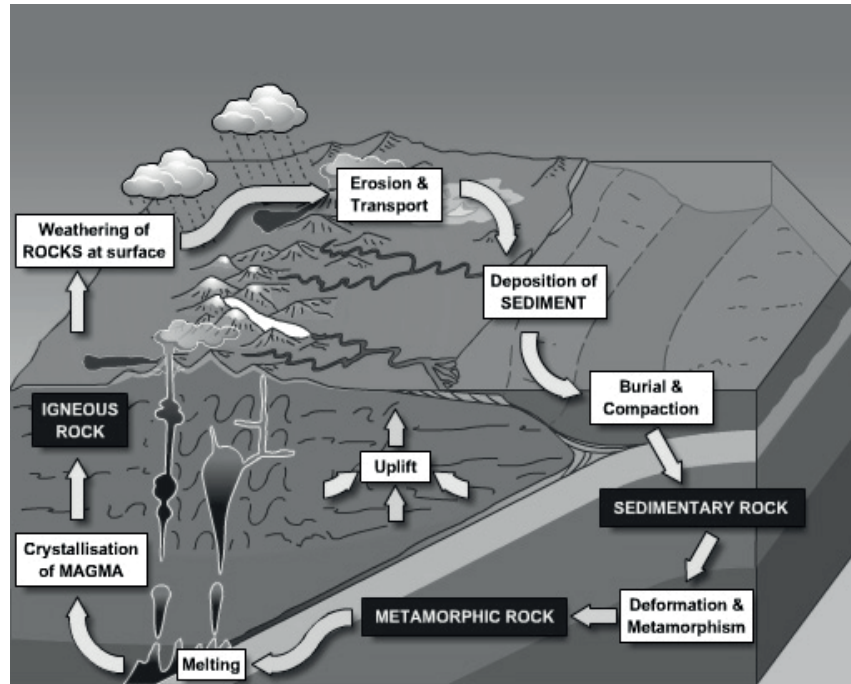
**Fig. 2.** Water cycle as a global natural intersystem process. Numbers show the volume in thousands of cubic miles



**Table 1.** Inter(supra)system global natural processes

Atmosphere	Hydrosphere	Cryosphere	Pedosphere	Lithosphere	Biosphere	Urbosphere (Urban Sphere)
Water Cycle						
Water precipitation	Water evaporation	Water freezing	Water infiltration	Water release (during volcanic ejection)	Water absorption	Water pollution

Another example, erosion, is destruction and transfer of upper soil layers and rocks, it occurs in lithosphere and pedosphere and involves influence of hydrosphere and atmosphere. However, erosion is a part of *global 'circulation' of precipitations*, one of the elements in chain of accumulation, destruction and transfer of rocks (Fig. 3). Circulation of precipitations is global natural inter(supra)system process, too.

**Fig. 3.** 'Circulation' of precipitations as global natural intersystem process

There are many intersystem circulations, or cycles of global natural processes: cycles of oxygen, carbon dioxide, carbon, nitrogen and other elements and compounds.

In addition to general (suprasystem) global natural processes, there are also some specific processes (see Fig. 4). It should be noted, that many of natural processes are actually processes of socio-natural type. Everyone knows facts of floods, earthquakes, mudslides, avalanching, or dips of earth surface caused by human activity.

**Fig. 4.** Hierarchy of global socio-natural processes and systems