

Scaling view by the Virtual Nature Systems

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The Virtual Nature System is irreplaceable for research and evaluation for governing processes on the Earth. Processes on the Earth depends on external exogenous and endogenous influences, and on own dynamics of the Actual Nature Systems (ANS). To select part of the actors is impossible without take in account factor of the Time, factor for information safety during the Time. The stochastic nature of external influences and stochastic pattern for dynamics of Nature systems complicates evaluation of 2D threat of disasters. These are multi-layer, multi-scale, and multi-driven structures of surface processes. Their spatial-temporal overlapping of them generates relatively stable structure of river basins and of river net. Dynamics of processes in river basins results in remove of the former sediments and levels, and in displace of erosion/sedimentation pattern, in destroy and dissipation for a memory the ANS. This complex process results in the Information Loss Law (ILL) in the ANS, which gradually cut off own Past. This view on the GeoDynamics appeared after long time field measurements thousands of terrace levels, hundreds of terrace ranks, and terrace complexes in river basins (Klenov, 1986, 2004). Action of the ILL leads to blanks in natural records, which are non-linearly increasing to the Past, and in appearance of false trends in the records. This temporal barrier prevents evaluation of the history. The way to view spatial-temporal dynamics of the ANS is creation for the portrait Virtual Nature Systems, as acting doubles of the actual nature systems (ANS). Exogenous and endogenous influences are governing drivers of the ANS and of corresponding VNS. The VNS is necessary for research of spatial-temporal GeoDynamics. Unfortunately, the ILL is working not only for the Past, but also restrict 'view' the Future. It is because of future drivers are yet unknown with necessary exactness, and due high sensitivity of nature systems to external pressure. However, a time for validation of the VNS is short to receive non distorted records, but it provides satisfactory validation of the VNS, and provides satisfactory evaluation for stochastic patterns of disasters (floods and debris flows). The VNS gives a chance to divide exogenous (climatic) from tectonic influences. This property is invaluable for monitoring and scenarios of land use, engineering, and other human activity, under simultaneous climatic and tectonic impacts, for evaluation of threat's areas and tracks. The continually measured stochastic spatial-temporal interception of external impacts (storms, precipitations, of tectonic distorts, earthquakes, and others), does not make problems for the VNS (acting by observed records), and by imply the Moving Digital Earth (MDE) technology (by immediate reforming of external drivers to natural processes). It is a goal for the VNS and MDE, which becomes possible by remote sensing, by powerful computers, and by fast communications. The VNS/MDE presents corresponding mapping for processes in any area. Instead of problems of scaling the current task is to provide necessary spatial resolution of the basic multi-layer Matrix of variables and parameters. Problems are in procedures for filling up of large multi-layer M, quick computing and mapping of large areas. The scaling depends on a task. The acceptable spatial resolution of the Matrix must perceive in view to hazardous processes with acceptable in resolution. During the VNS practice were evaluated any imagined combines of exogenous-endogenous impacts (from linear to circle distort, blocks, volcanoes, earthquakes, and others, in a variety of scales from local to sub-continental. The single principle for choose a scale is that spatial resolution (cell size) should not ignore important details of the Earth. For the Rhine Basin was computed influence of small smooth tectonic distorts in a large area. It was resulted in essential change for pattern of erosion/sedimentation on a land, and in Coastal Zone. For small basis were computed scenarios for complex tectonic distorts, earthquakes, resulted in decreasing of soil/rock resistance and in sharp increasing of catastrophic debris flows and flash floods. Any scenarios are possible for the verified/validated VNS. The VNS is valuable for any area, and the MDE has a skill for mapping the soon Future, and for mapping of threats' areas and tracks.