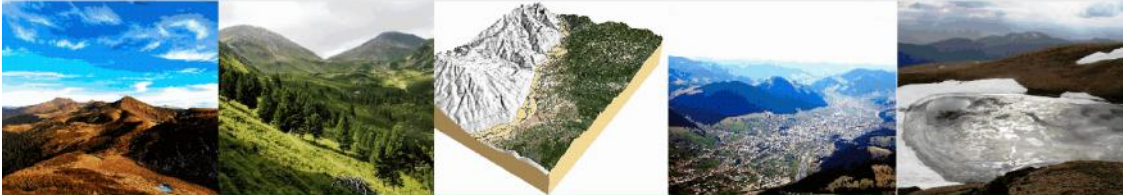




This work was supported by CNCS-UEFISCDI, Project number PNII-HDEI/WE 4-056/2012



Abstracts volume

INTERDISCIPLINARITY IN GEOSCIENCE IN THE CARPATHIAN BASIN

ISSN 2343-7391 GEOREVIEW
ISSN online 2343-7405

Editor
Marcel Mindrescu



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Suceava, 19-21 October 2012

Stefan cel Mare University Press
<http://georeview.ro> www.usv.ro <http://uefiscdi.gov.ro>

Water resources in the Romanian Carpathians and their management

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The Carpathians, covering of length of 1,000 km on Romanian's territory and surface 66,303 kms, 27.9% respectively. The Carpathians, their positions towards the air mass circulation from the West especially, are in fact an orographical dam differentiating the specific runoff of the streams. Thus, the values of hydrological parameter are higher on the mountain sides to the West than the ones on the opposite mountain sides of the same altitude. On an average, the runoff gradient is estimated as 5-6 l/s.kms up to 100 m with variations imposed by hydrographic basin exposure towards the continental and oceanic air mass circulation. Due to the Carpathian`display on few degrees of latitude and their position circulation directions, the vertical zonality law has a more important role in the physico-geographical differentiation than the latitudinal one. Besides the climatic factors, the forest and the alpine meadows covering the Carpathian space play an important part in forming and dimensioning the process of liquid runoff. The forest covers about 40-45% of the mountain surface reaching to 60-70% in some Eastern Carpathians massives. In the meantime, worth mentioning are the alpine and sub-alpine meadows which extend over the upper limit of the forest(14,000 kms, it means 21%) playing an important part in soil protection against erosion and in moderating the liquid runoff process under a continental-temperate climate condition. The Carpathians represent the origin place for almost all the rivers in Romania. Due this typical situation, the discharge, at the exterior limit of mountains space, are rather reduced through the specific runoff is great enough (between 7 to 50 l/s.kms). All these, due to their palaeogeographical evolution, some rivers (the Olt, Mureş and Someş) being obliged to cross downstream the mountain chain, are forming gorges. Within traverse valley sectors, the medium discharge of the above-mentioned rivers is about 100 mc/s. The other Carpathian rivers around the area have a medium discharge of tens oder mc. Though the geological, geomorphological and hydrological conditions are favourable for complex function accumulation lake building, hydroenergetical especially, due to their reduced discharge, a lot of captures from the lateral rivers are necessary to rise the discharges.Worth mentioning to the same effect is - Vidra reservoir, placed on the Lotru river, for which besides the 4.5 mc/s from the main river,other 11.2 mc/s are brought from the neighbouring rivers through 132 kms of galleries; while in Vidraru reservoir, on the Argeş river, 12.2 mc/s from other rivers through 29 kms galleries are added to its 7.5 mc/s. The examples may continue, gura Apelor reservoir, Râul Mare in Retezat, the Fântânele reservoir on the Someşul Mare in the Apuseni Mountains, a.s.o. The evaluation of the water volume came from the river runoff was undertaken following the medium annual runoff map on a scale of 1:500,000 from 1990, drawn out by Institute of Hydrology on the relief units it has been calculated my-self, the water volume flowed on each unit which summing up resulted in the total water

volume for Romanian Carpathians space. This water volume is reckoned at 27.4 thousand million mc/year i.e. 68.6% from the whole volume flown on the entire hydrographic network in Romania (40.6 thousand million mc/year), save for the Danube. The through quantitative-qualitative and temporary-spatial knowledge of the water resource from the various Carpathians units of different orders gives the possibility of establishing the water potential, the economic profiles and their management in building macro- and micro hydropower-stations, drinking water, industrial and irrigation catchments and limiting protection areas. Though man has humanized the Carpathian space since ancient times, the population density is obviously reduced. The estimations have brought into light that 3.2 million persons live here in numerous villages and more than 60 towns (50 inhabitants/kms). The large majority dwell in depressions and at the foot of the mountain. Taking into consideration the important water volume which is annually regenerating, its high qualities and regime during the year time, the Carpathians should constitute a very special objective for the geographical space planning in Romania. Some protection perimeters (hydroreserves) with different restriction degrees should be set up in the mountain massifs with a high specific runoff, in fact supply basins for the main rivers in Romania. The implementation of different size reservoirs (volume, surface and depth) on the yearly runoff variation (diminution during autumn and winter time) as they assure a constant discharge for the consumers. The reservoirs should form part of the hydroreserves or protected even outside their perimeter. Given the Carpathian central position on Romania's territory and the height difference between reservoirs and the consumers in the peri-Carpathian regions, there ought to be achieved gravitational water supplies by buried pipes with reduced energy consumption.