GEOGRAPHICAL RESEARCH INSTITUTE
Hungarian Academy of Sciences
Scientific Activity Report'10

I. Main tasks of the Institute

The Geographical Research Institute Hungarian Academy of Sciences (GRI HAS) continued to pursue research activities as a member of the Association of Institutes in Geosciences of the HAS in 2010. The most important tasks included the investigations into the short- and long term changes in natural environment anticipated and into transformation processes of socio-economic spatial structure. These activities formed part of international research projects launched previously (SefoNe, SOWAP, EU-6 BORASSUS, ACRE etc.), and of projects announced by domestic research centres and by academic and governmental organizations (National Scientific Research Fund: OTKA, etc.). A major task was to publish the second, revised and updated version of the "Inventory of Natural Microregions of Hungary" and, as part of the preparatory work of the National Atlas of Hungary, to compile the Hungarian version of the thematic atlas, Hungary in Maps, first published in 2009 in English.

The main tasks in the physical geographical domain were the continuation of the projects in progress and presentation of the results at Hungarian and international forums. In the Department of Physical Geography the following topics were elaborated either independently or in collaboration: "The role of gully erosion in the present-day relief development of Hungary (OTKA),"Effect of landscape pattern on macro and micro element budgets of wetlands, "The Environmental and Socio-Economic Contribution of Palm Geotextiles to Sustainable Development and Soil Conservation" (BORASSUS), "Comparison of the impact of different Best Management Practices on runoff from a maize field treated with an early post-emergence herbicide product" (MARGIN), "Water budget investigations of soils under Conventional and Conservation tillage". The colleagues from the physical geographical domain also took part in preparations of the IV. Hungarian Landscape Ecology Conference held in Kerekegyháza between 13th and 15th May.

Research activities in sample areas to facilitate deposition and safe storage of radioactive wastes of low and intermediary activity as by-products of nuclear energy generation continued to be a complex scientific operation. In 2010 comprehensive studies focused on environmental monitoring, hydrogeographical and soil erosion measurements in the surroundings of Radioactive Waste Treatment Disposal Facilities at Püspökszilágy and of the National Radioactive Waste Repository at Bátaapáti.

The *Department of Geomorphology and Quaternary Research* carried out research in three main topics. The members of the Department conducted geomorphological and neotectonical research for the proposed enlargement of the Paks Nuclear Power Plant. During this research the landforms and geomorphic surfaces in the wider environs of the power plant and the floodplain along the Danube (NNE of the power plant) were studied from the perspective of neotectonics. The relationship between the earthquakes and the environmental geomorphologic processes were also studied. The department also carried out a geomorphological strategic research after the red sludge spill accident at the alumina works of Ajka. The chairman of the Hungarian Academy of Sciences commissioned the GRI

to work out a scientific project to eliminate the damages. The results and proposals of this work and the environmental geographic conditions of the Hungarian red sludge reservoirs were presented in a scientific study entitled "Channel regulation of Torna stream to improve environmental conditions in the vicinity of red sludge reservoirs at Ajka, Hungary". The floods and waterlogging in 2010 attracted the attention of public to the fact that the management of the active and low floodplains must be built in a new complex national water management system. To attain this objective the department co-operated with other research institutes to work out a strategy to combat floods and waterlogging.

In the *Department of Human Geography* two EU FP6 projects terminated in 2010: ACRE („Accommodating Creative Knowledge: competitiveness of European metropolitan regions within the enlarged Union") and SeFoNe ("Searching for Neighbours: dynamics of physical and mental borders in the New Europe"). "Revitalisierung von gründerzeitlichen Altbauwohnquartieren in Budapest – Prozesse, Strategien, Perspektiven" was financed jointly by HAS-DFG (German Research Foundation). Another project entitled „Zwischen Gentrification und Abwärtsspirale" was supported by the DFG. On behalf of the Presidium of HAS a thematic atlas in English entitled „Hungary in Maps" was published in 2009; in 2010 the preparation of the Hungarian version was one of the main tasks, including revision of the manuscripts, thematic checking and preparation of insert maps. Another major venture was to publish the second edition of „Inventory of Natural Microregions of Hungary" in 876 pages (236 maps included), which became a great success both in professional circles and among general public.

II. Outstanding research and other results

One of the main tasks was the geomorphological and neotectonical research for the proposed enlargement of the Paks Nuclear Power Plant. During this research the landforms and surfaces in the wider environs of the power plant and the floodplain along the Danube (NNE of the power plant) were mapped and investigated from the aspect of neotectonics. During the geomorphological and neotectonical research, field studies were made to explore and evaluate the proposed location of the expansion.

The most important geomorphological strategic research was the exploratory and analyzing work of the red sludge accident at Ajka alumina factory. The news on the catastrophe spread quickly around the world and had drawn the attention to the geographical factors which contribute to the development of industrial and natural disasters and to the importance of the responsible thinking, prevention and safety. The institute took a coordinator role in the elaboration of an environmental strategy to prevent further catastrophes in the future. Geomorphological survey of the hazard posed by similar reservoirs in Hungary has also been performed.

As a result of the project "The long-term strategy of the flood-protection and safety", it was established that the supposed climate change during the last 10–15 years and the anthropogenic interventions altogether caused record high water stages and flood events of increasing frequency. The geomorphologists in the institute proposed that the low floodplains should be reoccupied by river in some places to create proper conditions for the traditional water management and storage. That could be a favourable solution as there are limited possibilities to raise the embankments due to the siltation on the floodplains. Hungary is in need of a long-term (50–100 years) hydrologic strategy.

In the frame of „OTKA 76434" project: "The role of gully erosion in the present-day geomorphic processes in Hungary" the small scale mapping of gullies is being converted into digital form for the whole country. By the end of the last year 105,000 linear erosion features evolved in the hills had been digitized. The total length of the digitized features is more than 21,000,000 km. The land use and the soil characteristics of the surrounding areas of the gullies are also represented on the maps.

The most important scientific development of BORASSUS project was the demonstration of the effects of geotextiles on soil moisture and showing the differences in soil moisture dynamics depending on the geographical location and the types of geotextile fabric on the various sample plots. The sample plots are situated in areas under different climates. Brazilian, Chinese, Hungarian, Lithuanian, Thai and Vietnamese measurement data were evaluated. The measurements in the soil erosion plots were made by applying the gravimetric method. The favourable effects of the geotextiles show up in case the annual precipitation is more than 700 mm and the annual temperature variation is less than 28º Celsius. The highest values of soil moisture variation can be detected in the moderate climate zone, while the highest soil moisture surplus is typical under an udic soil moisture regime.

The main purpose of the research supported by OTKA called "Spatial structural impacts of industrial investments and their transport connections" was to analyze the transport geographical locations and transport accessibility of industrial parks. Based on a survey carried out in industrial parks they were classified into 7 major groups and 13 subgroups. Elements of transport network were established those having played an important role in the location choice. It could be realized that the quality of transport connections and the development of transport network had exerted a major impact on the development of industrial parks. The research and its basic results have been reported at two international conferences.

OTKA project "Health tourism and quality of life in Hungary" summarized the relationship between tourism and quality of life in Hungary in a book published by GRI. This volume provides the theoretical basis of the dimension of health tourism. With the help of a questionnaire (n=500) the local population's opinion of Orosháza town about and attitudes towards the nearby spa opened in 2004 were investigated; in addition the contribution of the new spa to the tourism industry and its other external effects were described. Using internet sources content analysis was made about health services in Hungary for revealing the attitudes towards and feelings about tourism. As a result a map was constructed about the medical tourism in Hungary.

ACRE project covered the time span between October 2006 and September 2010. This was an Integrated Project, financed by the European Commission within the FP6 with a total budget of 4.5 M Euro. The project aimed to assess the impact of the emerging 'creative class' and 'creative industries' on the competitiveness of EU metropolitan regions. The focal question studied was: what are the conditions for creating or stimulating 'creative knowledge regions' in the context of the enlarged European Union? The project analyzed and compared recent socio-economic development trends, strategies and policies in 13 metropolitan regions across Europe (Amsterdam, Barcelona, Birmingham, Budapest, Dublin, Helsinki, Leipzig, Milan, Munich, Poznań, Riga, Sofia and Toulouse) to get more insight about the extent to which creativity, innovation and knowledge are connected and serve as keys to a successful long-term economic development. According to the outcomes of the project the consortium formulated many targeted messages and recommendations to policy makers to enhance the importance of creative industries and to develop the competitiveness of metropolitan regions investigated.

In the frame of „Zwischen Gentrification und Abwärtsspirale" (DFG) project interviews were carried out with experts and inhabitants from a gated community, in Budapest. The research shed light on the circumstances of the investments, the evolved conflicts it made, and the relationships among the inhabitants and their opinion about the local government. The results synthesize the inner differentiation of post-socialist cities, including Budapest, and its improving or deteriorating quarters. The results can directly be used in the urban development strategy of Budapest.

The departments of the institute were involved in several researches addressing not just the academic community but the society as well. The public was informed through the media such as articles and news broadcasting.

III. International relations

In the near future the institute is aiming to put special focus on its international relations. The institute made efforts to maintain and enlarge its multilateral international relationships. In order to fulfil this aim participated in several EU and other international projects, making use of the researchers international contacts. A part of them is related to education: one researcher is employed in J. Selye University (Komárno, Slovakia), another in Babeş-Bolyai University (Cluj, Romania). Another chain is the numerous position in scientific societies and editorial boards. Among the colleagues three participate in the work of international committees for a long time, nine of them are involved in editorial boards of international journals. Of the scientific advisors one is vice president at ESSC (European Society for Soil Conservation).

In 2010 numerous conferences, workshops were organized or co-organized by colleagues from GRI (e.g. Creaticity conference at Budapest, HUNGEO 2010 and. X. Worldwide meeting of Hungarian Geoscientists in Szombathely, Hungary).

Among international scientific conferences researchers from the institute participated in the following: GEOMED 2010 The 2nd International Geography Symposium – Mediterranean Environment (Kemer-Antalya, Turkey); UNESCO Chair on Eremology: Workshop and 3rd Conference on Desertification and Land Degradation (Gent, Belgium); "Soil solutions for a changing world" – 19th World Congress of Soil Science (Brisbane, Australia); IGU Globality Commission Meeting (University of Haifa, Israel); X. Seminario Internazionale di Geografia Medica (Roma, Italy); Association of American Geographers, Annual Meeting (Washington D.C., USA).

The bilateral relations were especially close with the geographical units of the Romanian, Ukrainian, Croatian and Slovak academies, with the Institut für Länderkunde (Leipzig), Shevchenko University (Kyiv), Akademie für Raumordnung und Landesplanung (Hannover), with the universities of Zagreb, Leipzig, Cluj, Bern, Berlin, Novi Sad, and the college in Berehove (Ukraine).

These relations are also connected to special research programmes, research projects or bilateral research agreements (EU FP6, SNSF, DFG, joint research programmes financed by the HAS, etc.). In 2010 a special attention was paid on the formerly strong Eastern relations of the GRI, which were neglected following the transition in 1990. On November a delegation travelled to Moscow from GRI to discuss the ways of possible future collaboration, while in December a delegation arrived from the National Academy of Sciences of Belarus.

Ágnes Erőss

Hungarian Geographical Bulletin

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