

**THE DEPARTMENT OF CLIMATOLOGY AND LANDSCAPE ECOLOGY OF
THE UNIVERSITY OF SZEGED IS 60 YEARS OLD – FROM THE BEGINNING
TO PRESENT**

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1. PRELUDE

After the turbulent years following World War I, in 1921 the geographers arriving to Szeged from the university in Cluj (Kolozsvár), which had come under Romanian rule, were temporarily placed in the building at No. 13 Dugonics Square. In the same year, the field of archaeology became independent and the Geographical and Historical Institute was founded with *Sándor Márki* in the lead. In 1923 *Károly Kogutowicz* was entrusted with the management of the (by then independent) Geographical Institute that he headed until 1944.



Sándor Márki (1853 – 1925), Head of the
Institute between 1921 and 1923



Károly Kogutowicz (1886 – 1948), Head of
the Institute between 1923 and 1944

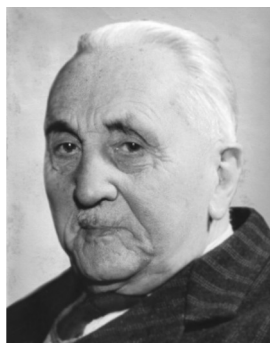
Károly Kogutowicz made considerable effort to enrich the material assets of his institution. As Head of the Institute and professor, he taught general and comparative geography; however besides his organisational activity he had little time for teaching therefore most of that task was undertaken by his colleagues (especially *Gábor Schilling*). In the years 1929-1930 he also held the position of Dean while in 1941-42 he became the Rector of the University of Szeged. His school atlas was widely used in geographical education even in the 1940's. He was a member of several scientific societies, among them

the Hungarian Meteorological Society. He engaged in extensive public activity. He also extensively studied the issue of agriculture and exploitation possibilities of the Sand Ridge region west of Szeged. He created a model farm in Újszeged and landholders arriving for advice were daily guests at the institute. His most important works are various thematic maps and his two-volume book titled "Dunántúl és Kisalföld" (Transdanubia and the Little Plains).



Gábor Schilling (1887 – 1957),
Professor of the Institute
between 1921 and 1938

In 1925 the institution was given the new official name of Institute of Geography, Meteorological and Seismographic Observatory. The relatively new building of the Hungarian Central Railway Clearing Agency (finished in 1912) had already been offered to the future University of Szeged earlier but it only came to be effectively owned by the university in 1925, after the railway agency ceased to exist. The Geographical Institute was at first placed on the ground floor of the building, and then in 1930 it moved upstairs to the 3rd, 4th and 5th floors.



Gyula Prinz (1882 – 1973),
Head of the Institute between
1945 and 1957

In 1940, the University of Szeged split in two: one part returned to Cluj (Kolozsvar), the other part became the Horthy Miklós University. In October 1944, as a result of war events, the university was evacuated and directed to Sopron, but some of the teachers went to Budapest, and the building became a Soviet military hospital. With the valuable instruments that had been wrapped in boxes and thus saved (although partly damaged) the work could begin again in the institute in the end of 1945, this time as part of the University of Szeged (from 1962 called József Attila University). Temporarily *Aurél Littke*, a retired professor of the Teacher's College assumed the leadership of the Institute of Geography. On 4 August 1945 *Gyula Prinz* was appointed Head of the Institute, who was also elected Dean of the Faculty of Arts for the academic year 1948/49. One of his young colleagues, *Richárd Wagner* habilitated in the summer of 1946 in the field of meteorology.

2. THE ESTABLISHMENT OF THE DEPARTMENT AND THE FIRST 40 YEARS

In 1952 the Institute of Geography was split in two; the No. 1 Institute of Geography was established under the leadership of *Gyula Prinz* while *Richárd Wagner* became head of the No. 2 Institute of Geography (from 1953 Institute of Climatology, from 1964 Department of Climatology). In the latter meteorological and climatological research has started and thus a university meteorological station could be established on the 5th floor. In 1959 the first volume of the *Acta Climatologica Universitatis Szegediensis* (from 2001 called *Acta Climatologica et Chorologica*) was published. This journal reflects the earlier and current scientific activity of the department.

Both the Institute of Geography and the Department of Climatology were in contact with the Hungarian meteorologists from the very beginning. Within the frames of this cooperation *Alfréd Hille* university lecturer taught meteorology at the University of Szeged from 1930, while from 1965 honorary professor *Béla Béll* held lectures. Alfréd Hille was one of the pioneers of aviation meteorology in our country, whereas Béla Béll was a prominent representative of high-atmosphere research (aerology) besides *György Marczell* (after whom the department's lecture hall was named).

When Richárd Wagner died in 1972, his successor was *György Péczely*. Under his leadership the department's research activities focused on synoptic and statistical climatology and additionally, an urban climate station network was established in Szeged, which operated for 3 years. Professor Péczely's work means an important milestone in the life of the department. In his time the educational and research work of the department was completely revamped. New subjects were introduced in the field of meteorology and climatology, and their teaching was mostly based on György Péczely's own notes and textbooks. Besides the scientific background of Professor Péczely his personality also contributed to a large number of students applying for faculty research work, the results of which were presented at the National Student Research Conferences. In 1981, the 15th such National Conference was held in Szeged and due to the large number of local applicants (13 people) a separate Climatology section had to be opened, in which only the students of the Department of Climatology, University of Szeged presented their work.

In 1983 the Department of Mineralogy, Geochemistry and Petrology together with the Department of Geology and Paleontology established the Geology Division, while the Departments of Physical Geography, Social Geography and Climatology formed the Geography Division. In the academic year 1986/87 the two merged and thus formed the Geography and Geology Division, whose first leader was Professor *Gyula Grasselly*.

On 3 March 1984 Professor György Péczely deceased. *János Juhász* was appointed as deputy then following his death in the autumn of the same year *László Jakucs* managed the department.

From the summer of 1986, until his retirement in 1995, *György Koppány* was the Head of Department of Climatology. Under his leadership new research directions were introduced such as historical climatology, the study of stratospheric ozone, and drought forecasting. Urban climate research also started at that time.



Richárd Wagner (1905 – 1972),
Head of Department between
1952 and 1972



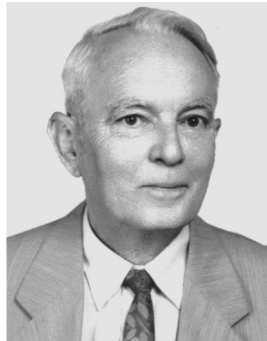
György Péczely (1929 – 1984),
Head of Department between
1973 and 1984



János Juhász (1921 – 1984), temporary Head of Department in 1984



László Jakucs (1926 – 2001), temporary Head of Department in between 1984 and 1986



György Koppány (1932 –), Head of Department between 1986 and 1995

3. THE DEPARTMENT IN THE NEAR PAST AND TODAY

Between 1995 and 2006 *Ilona Bárány-Kevei* was the head of department, newly renamed to Department of Climatology and Landscape Ecology. She was the first female geographer in Hungary to become Doctor of the Hungarian Academy of Sciences (in 2003). Under her leadership, the department has expanded its research area to the field of landscape ecology. In 2007 *János Unger* took over the management of the department.

Today, the Department of Climatology and Landscape Ecology is responsible for several basic courses in the Earth Sciences, Geography, Environmental Science, Environmental Engineering and Physics BSc programmes. Meteorology, climatology, cartography and landscape ecology-themed subjects form a central part of the curriculum and are studied by a significant number of students. The department is involved in the Earth Science, Geographer and Environmental Science MSc programmes holding several applied courses and according to the plans it would play a role in the future Environmental Engineering MSc training as well.



Ilona Bárány-Kevei (1941 –), Head of Department between 1995 and 2006



János Unger (1958 –), Head of Department since 2007

The lecturers and the PhD students of the department conduct research in the fields of urban climate, air pollution and landscape ecology, which attract many students (dissertations, theses, student research). Related to these research topics, in the last 17 years fourteen people earned their PhD degrees, two habilitated and two persons earned the title Doctor of the Hungarian Academy of Sciences. Our support of the new generation and the involvement of the students in research are well demonstrated by the fact that our students won 16 prizes and special prizes at the National Student Conferences with studies related to ongoing projects. The department maintains research collaboration with a number of Hungarian and foreign research institutions of similar profile (e.g. Albert-Ludwigs Universität Freiburg, HAS Research Centre of Ecology, Institute of Ecology and Botany, Wageningen University and Research Centre, Corvinus University of Budapest, Eötvös Loránd University, Debrecen University, Hungarian Meteorological Service, University of Novi Sad, etc.).

Our urban climate research focuses on the climate-modifying effects of the artificial urban environment, particularly excess temperature and its governing factors. We are looking for the relationship between city districts classified in local climate zones and their thermal characteristics. Furthermore human comfort analyses are carried out in different urban micro-environments, both using measurements and modeling. In the future, these thermal comfort condition analyses are planned to be extended in the form of parallel measurements and human monitoring based on extended instrumentation in several areas of the city, which are suitable for recreation. We would also simulate the changes of comfort conditions according to different climate change scenarios.

Our latest research analyses in detail the climatic impact of urban woody vegetation e.g. by working out methods, which make it possible to model the radiation-modifying effect of trees. These studies are partly connected to landscape ecological research since they also aim to analyze several other aspects of the woody vegetation and a wide spectrum of their ecological services. Another branch of our urban climatological research deals with the meteorological and climatological effects of complex urban surface geometry. In the course of these investigations, a 3D building database of the city of Szeged was created, which contains most of the buildings of the inner areas along with their height data. This database is currently further extended within the frames of a project by the automated measurement of the woody vegetation. Related to this branch of research a number of

software processes and models have been created, such as a method for calculating the sky view factor, which has considerable impact on the urban radiation budget or a simple method for the delineation of urban ventilation paths. This research direction focuses in the short term on utilizing the developed methods in urban planning but at the same time our long-term goal is to appropriately describe urban surface geometry and its effects on urban atmosphere so that urban areas and their processes can be integrated into different meteorological and climatological numerical simulation models.

The complex landscape ecological research (including climate, topography, soil, wildlife and landscape history-related topics) conducted at the department is, in part due to the traditions, still mostly related to karstecology. Besides the analysis of karst morphological processes and the investigation of the water quality of karstic lakes, we also study stand dynamics in karstic forests. Our long-term study site is the Haragistya-Lófej forest reserve in Aggtelek Karst, where the forest stand characteristics, spatial and temporal patterns are analyzed in terms of management history and site characteristics. Temporal changes of the forest cover in Hungarian karst areas are also studied using EO data (aerial photographs, satellite images) and object-based image analysis. Related to the above we investigate the ecosystem services (timber production, C-sequestration, etc.) of the natural and managed forests as well as the related land use conflicts in different types of areas. A new research has recently started in the floodplain area of the river Maros, which aims to evaluate the local forest ecosystem services in order to compare different-intensity management alternatives of the riparian forests in the interests of identifying the most appropriate floodplain land use.

In the course of our air pollution-related research, we identify the long-term transport systems modifying the local PM₁₀ and ragweed pollen concentrations in the frames of the meteorological aspects of air pollutants for various European cities using the HYSPLIT dispersion model. In the future, we work out new techniques for the prediction of ragweed pollen characteristics, which could be recommended for use by the media. We would also try out some new methods, so far unused for predicting ragweed pollen concentration and compare the effectiveness of these methods. We analyze the relationship of respiratory diseases with the meteorological elements, as well as chemical and biological air pollutants. We furthermore study the relationship between allergic asthma emergencies, allergic rhinitis and the main biological and chemical air pollutants with particular regard to extreme patient numbers.

We study the climate sensitivity of different taxa in the context of global warming by introducing new statistical procedures and new climate change imperatives. We examine the effect of land use changes on the current pollen concentrations and separate the effect of the present meteorological elements and past climatic parameters on the different taxa using a new statistical method and we determine the actual weight of these factors. We analyze the role of socio-demographic and environmental factors in the development of allergic rhinitis and asthma. We study the interdiurnal variability of the pollens of the selected taxa in the context of the meteorological elements. We examine the relationship between the phenological and quantitative characteristics of the pollination and the extreme values of meteorological elements; furthermore we are looking for a relationship between the rank of importance of the pollen characteristics and the rank of importance of the annual values of meteorological variables. We also analyze how the values of meteorological elements relate to extreme Ambrosia pollen loads, and the extreme pollen load considering all the other taxa, with the exception of the Ambrosia pollen.

The current cartographic research at the department is multidirectional. The objective of our thematic cartographic research is the investigation of the theoretical and practical background and regularities of editing digital maps of a variety of natural and social subjects, in particular the applicability of GIS-supported cartographic methods in different areas (e.g. research, risk assessment, decision-making). Our research of cognitive and mental maps and mapping aims a better understanding of the subjective aspects that the real maps do not contain, yet they are an important source of information on the map-makers themselves (their views of the world, values, the love of their homes, their identification with it, prejudices, misbeliefs and desires). Recalling and analyzing such hidden aspects of our spatial world view can facilitate the solution in many issues (e.g. urban spatial planning or research of the relationship to our environment or on our decisions). Involving students, we investigate mental maps made about different areas according to the gender, age, place of origin, ethnic and cultural affiliation, educational background and social status of the maps' creators.

Our cartography historical research has both Hungarian and international aspects. The largest and longest-term project is the detailed analysis of Dutch-made maps and atlases of a half-century (approximately between 1680 and 1730) period. At this time the Dutch map and atlas publishers rarely or not at all dated their works. Thus, the history of map and atlas publication in this era is quite vague on many points. In order to clarify it we have developed a complex method, which is based on many pillars; its application is still in progress, but it has already produced many results and inspired attention.

In our department a meteorological station of the Hungarian Meteorological Service (OMSZ) has been operating since 1999 (supplemented by the measurements of the OMSZ Szeged Regional Centre). The data can be followed through an online visualization system since 2009. The measurement data of the two stations (including the visual perceptions of the outlying station, and the wind profiles) are available for both education and research purposes. We work in close cooperation with the staff of the Regional Centre, so our students studying in the Earth Science BSc programme have an opportunity to get to know the meteorological station and the measurements carried out there as well.

The instrumentation of the department, which can also be used for the students' work consists of a variety of traditional analog instruments, digital temperature, humidity and wind data loggers, and two mobile micro-climate measurement units. The lectures are held in a 48-seat modern and well-equipped classroom at the department, or in the 200-seat auditorium and two computer labs (where a total of 70 advanced workstations are available) of the division.

The current staff of our department are the following: Dr János Unger head of department - associate professor, Dr Tamás Gál deputy head of department - assistant professor, Dr Ágnes Gulyás deputy head of department - assistant professor, Dr. Ilona Bárány-Kevei professor emerita, Dr László Makra associate professor, Dr Zoltán Sümeghy assistant professor, Dr Eszter Tanács assistant professor, Dr Noémi Kántor research assistant, Éva Kosztolányi administrative secretary. The PhD students of our department in 2012 are the following: Zoltán Csépe, Lilla Égerházi, Márton Kiss, Attila Kovács, Mária Kovács, Enikő Lelovics.

J Unger, I Bárány-Kevei, T Gál, Á gulyás, G Koppány, L Makra, Z Sümeghy and E Tanács



The current staff and PhD students of the department. Standing in the back row (from left to right): Z Sümeghy, Z Csépe, É Kosztolányi, J Unger, N Kántor, M Kiss and L Makra; Sitting in the front row (from left to right): I Bárány-Kevei, Á Gulyás, L Égerházi, A Kovács, E Tanács, E Lelovics and T Gál