

## THE FINAL NATIONAL REPORT ON CARRYING OUT OF THE CERGOP PROJECT FOR 1994-1997 IN UKRAINE

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*Abstract.* Report presented at the Ninth CEI CERGOP Working Conference of the National Investigators of the CERGOP Project and the Chairmen of the CERGOP Study Groups May 5-7, 1998, Wetzlar, Germany.

### Introduction

This report summarises the following works within CEI CERGOP Project having been carried out during the period since the First CEI CERGOP Working Conference was held on 17-18 February, 1994.

#### 1. Activities concerning CERGOP 1994-1997

##### 1.1. Carrying out of the CEGRN campaigns in Ukraine

According to the planned programme of the CERGOP Project, two points – Lviv (LVIV) and Uzhgorod (UZHG) are included into the project from Ukraine. The LVIV point is situated in the west of the East-European plate-form (the Precarpathians); the UZHG point is in the zone of the Transcarpathian flexure. Between these points the zone of the Ukrainian Carpathians is situated which is characterized by active tectonic processes. The system of different direction fissures, particularly longitudinal abyssal fissures, extending north-west to the territory of Poland and south-west to the territory of Romania, is available here, too. The Lviv point is situated in the vicinity of the Lviv University Astronomical Observatory 10km to the north-west of the city centre. The UZHG point is established at the Satellite Observatory Station of the Uzhgorod University and situated 20km away from the city centre to the south-east. Both points had been laid in 1994. Each of ones has a reliable stabilization and a rigid centering device laid in pillar. The constructions and sizes of these points are permitting to carry out both the measurements of GPS and geodetic and gravimetric ones.

The GPS measurements on LVIV and UZHG points were carried out according to the planned programmes of the CEGRN campaigns for four years (1994-1997). The measurements were carried out by the specialists of Geodynamics and GPS

laboratories of the State University "Lviv Polytechnic" and General Administration of Geodesy, Cartography and Cadastre of Ukraine with the help of receivers TRIMBLE 4000 SSE.

In the period of the CEGRN' 96 and CEGRN' 97 campaigns the GPS measurements were performed on the Epoch Station SULP (State University "Lviv Polytechnic") as well.

##### 1.2. On the activity in the CEI CERGOP Study Groups

###### 1.2.1. On the activity in the CEI CERGOP Study Group CSG8 "Geotectonic analysis of the region of Central Europe"

According to the plan of works within of the Study Group CSG8 "Geotectonic analysis of the region of Central Europe" the monograph "Geodynamics of Northern Carpathians" (responsible person – F.Zablotskyj) had been prepared by the end of 1997. The preparation of this monograph was made by a large group of authors from Ukraine and of several persons from Moscow, Budapest and Bratislava. This group includes noted scientists in the field of geophysics, geology and geodesy who had conducted studies in the Carpathian Region for many years.

The monograph "Geodynamics of Northern Carpathians" has been published at present (REPORTS ON GEODESY, IGGA WUT, N6(36), Warsaw, 1998) and it includes: introduction, four chapters, conclusion and literature list containing 271 names. This monograph contains 162 pages as a whole, including 39 figures and 3 tables.

###### 1.2.2. On the activity in the CEI CERGOP Study Group CSG6 "CEGRN and height determination"

Within the planned works of Study Group CSG6 "CEGRN and height determination" the following

investigations were carried out (responsible person, member of CEI CSG6 - Dr.K.Tretyak).

The data collection of the second precise levelling on the territory of Ukraine was conducted. An adjustment of the 1-st class traverses and estimate of accuracy of the 1-st and 2-nd classes levelling were performed. The vertical gradients' maps of the recent crustal movements of Ukrainian mountain regions were worked out by means of these data.

### *1.2.3. On the activity in the CEI CERGOP Study Group CSG1 "Investigation of tropospheric delays"*

Within the frame of works of Study Group CSG1 "Investigation of tropospheric delays" the researches and analyses of atmospheric influences on the results of linear measurements to satellites on the CERGOP points of Ukraine were continued (investigators - F.Zablotskyj and B.Palyanytsya).

Character of the correction to station-satellite distance was studied in radio - and optical range by means of aerological soundings data depending on change of the atmospheric stratification with height, seasonal trend and other factors.

### *1.2.4. On the activity in the CEI CERGOP Study Group CSG6 "Permanent and Epoch GPS CERGOP stations"*

In accordance with the working programme of the Study Group CSG5 "Permanent and Epoch GPS CERGOP stations" the Epoch station SULP was established at the Astronomical Observatory of the Chair of Geodesy and Astronomy of the State University "Lviv Polytechnic". The rigid construction for setting of the GPS antenna has been build on the central pillar of the observatory. At present, the SULP station has been connected to the INTERNET communication. It is planning the permanent station on the SULP point will begin function in the next future.

### *1.3. On the activity in other geodynamic investigations*

In October 1996 the scientific-technical Ukrainian-Polish conference "Astro-Meteorological Observatory at the Mount Pip-Ivan (2022 m). Restoration and the ways to resume its activity" was held in Jaremche (Ukrainian Carpathians). Many leading scientists in

geophysics, astronomy, geodesy, ecology, architecture and other sciences from Ukraine and Poland took part in this conference. The participants have decided to resume the activity of the observatory as an Ukrainian-Polish scientific centre. Several laboratories working permanently and other comfortable facilities for scientific work, rooms for international conferences will be reconstructed. This centre can also serve as an international research centre of the Central European Initiative.

At the last years the search works and architectural-archeological measurements of the observatory construction were performed and the project of restoration of the observatory building was worked out

In July 1997 the reconnaissance works had been executed on the Charnohora massif for the reason of creation of the geodynamic test field in this region. Nineteen locations of the network points have been chosen. All points are situated on the dominant tops of the Charnohora mountain-mass.

## *2. Benefits from CERGOP Project*

The main achievements from realisation of the CERGOP Project consists in the following:

- A complete programme of the GPS measurements on the LVIV and UZHD points had been carried out within CEGRN campaigns during 1994 - 1997. The results of these observations together with other measurements will make it possible for more precise definition of movements of two blocks joined to the North - Eastern Carpathians.
- Organization a one of the permanent GPS stations on the SULP point is solved
- The monograph "Geodynamics of Northern Carpathians" has been published at present. The most important peculiarity of this monograph is its integrity. It demonstrates the first attempt of unification, in one research and on a common geotectonic basis, of the ideas generated by a large group of scientists - geologists, geophysicists and geodesists studying - paleogeodynamic and present development of the Carpathian Belt.
- Acquisition of an experience in the International scientific collaboration.

3. List of papers related to CERGOP

- Bendyna, M.; Sledzinski, J.; Tretyak, K.; Zablotskyj, F.: Progress in establishment of the Ukrainian-Polish observatory Pip-Ivan in Charnohora. Paper presented at the XXIII General Assembly of the European Geophysical Society, Session G16 "Geodetic and geodynamic achievements of the CEI (Central European Initiative)", Nice, France, 1998
- Dultsev, A., Romanyshyn, P.; Cheremshinsky, M.; Zablotskyj, F.. National Report on the preparation for the CEGRN'94 Campaign. Proceedings of the 1st CEI CERGOP Working Conference, REPORTS ON GEODESY, IG & GA WUT, N2(10), Warsaw, 1994, pp 169-173.
- Dultsev, A.; Tsyupak, I.: Comparison of processing results of the CEGRN'94 and CEGRN'95 GPS campaigns. Proceedings of the Conference "Achievements of the geodetic science and production in Ukraine", Lviv, 1997, pp 15-18 (Ukr.).
- GEODYNAMIC OF NORTHERN CARPATHIANS (responsible: F. Zablotskyj). CEI CERGOP Study Group '8 "Geotectonic Analysis of the Region of Central Europe", REPORTS ON GEODESY, IG & GA WUT, N6(36), Warsaw, 1998, 162p.
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- Ivankiv, J.; Dultsev, A., Zablotskyj, F.; Tretyak, K.; Sledzinski, J.: Establishment of the international geophysical station Pip-Ivan (2022 m) in Eastern Carpathians. Proceedings of the EGS Symposium G14 "Geodetic and Geodynamic Programmes of the CEI". REPORTS ON GEODESY, IGGA WUT, '3(26), Warsaw, 1997, pp 127-132.
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- Tretyak, K.; Zablotskyj, F.; Ostrovskyj, A.: The results of the investigations of the Earth surface horizontal deformations of the Carpathian geodynamic test field. Proceedings of the EGS Symposium G14 "Geodetic and Geodynamic Programmes of the CEI", REPORTS ON GEODESY, IGGA WUT, '3(26), Warsaw, 1997, pp 137-141.
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- Zablotskyj, F.: National Report of Ukraine on Cergop and Cergop related investigations. Proceedings of the 2nd CEI CERGOP Working Conference, REPORTS ON GEODESY, IG & GA WUT, N5(13), Warsaw, 1994.
- Zablotskyj, F.; Bondar, A.; Czeremshinsky, M.: National Report of Ukraine. Proceedings of the 4th Review Working Conference of the CEI Section C "GEODESY", REPORTS ON GEODESY, IG & GA WUT, N1(14), Warsaw, 1995, pp 133-136
- Zablotskyj, F.; Savchuk, S.; Zahorujko, V.: National Report on the preparation for the CEGRN'95 Campaign. Proceedings of the 3rd CEI CERGOP Working Conference, REPORTS ON GEODESY, IG & GA WUT, N3(16), Warsaw, 1995, pp 67-69.
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- Zablotskyj, F.; Tretyak, K.: Cooperation of the Ukrainian GPS stations in the International research programmes. Streszczenia referatow. Konferencja naukowa "Zastosowanie technik kosmicznych w geodesji i geodynamice", Torun, 1996.
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Ф. Заблоцький

КІНЦЕВИЙ НАЦІОНАЛЬНИЙ ЗВІТ ПРО ВИКОНАННЯ ПРОЕКТУ CERGOP  
У 1994 – 1997 РОКАХ В УКРАЇНІ

Резюме

Звіт представлений на 9 робочу конференцію CEI CERGOP національних дослідників проекту CERGOP та голов дослідницьких груп CERGOP 5-7 травня 1998 року, Ветцель, Німеччина.

Ф. Заблоцкий

ЗАКЛЮЧИТЕЛЬНЫЙ НАЦИОНАЛЬНЫЙ ОТЧЕТ О ВЫПОЛНЕНИИ ПРОЕКТА CERGOP  
В 1994 – 1997 ГОДАХ В УКРАИНЕ

Резюме

Отчет представлен на 9 рабочую конференцию CEI CERGOP национальных исследователей проекта CERGOP и председателей исследовательских групп CERGOP 5-7 мая 1998 года, Ветцель, Германия.