

Abstracts of the monograph work and scientific publications submitted for participation in a competition for the academic position "Associate Professor"

of

Chief assist. PhD Kiril Filipov Yanchev

Monograph

2020 – Issuing: Rehabilitation work – monograph - „**Geodetic activities for monitoring and studying the modern movements of the Earth's crust**“.

Summary: The monograph work examines the evolution of ideas on the subject and methods of modern geodynamics from the past half century to the present day. The problems of metrological support for the results of repeated observations obtained by methods of terrestrial and satellite geodesy are discussed. It has been shown that the main characteristics of modern geodynamic processes depend significantly on the space-time details of observation systems. Attention is paid to the different types of geodynamic polygons for monitoring and studying the modern movements of the Earth's crust, including their design, measurement and mathematical modeling of results.

Publications

1. 2014 – **Yanchev, K.**, „Study of the research and analyze results from triangulation of points on the ground with different geodezy methods and instruments“, Scientific conference with international participation "MATTEX 2014". Shumen, p. 204–210, ISSN: 1314-3921.

Summary: The subject of the study is to determine the position of points in space using different survey methods. Evaluate the accuracy of the results obtained by adjustment of the linear-angular geodetic network measured by the polar method, GNSS method with the use of virtual base stations and GNSS method using user base stations. Comparative analysis of the results obtained from the use of different surveying methods and instruments.

2. 2019 – **Yanchev, K.**, "Analysis of the methods for estimating the deformed state of sections of the crust". Yearbook: Technical Sciences. Volume IX E, Shumen, University Publishing House "Konstantin Preslavski University of Shumen", p. 81–85, ISSN: 1311–834X.

Summary: The subject of the study are the models of motion of the Earth's crust. The movement patterns also reflect the actual state of the earth's crust. If we assume a model in which the earth's crust is continuous, then the speed of movement of this surface must be continuous.

3. 2019 – **Yanchev, K.**, "Analysis of geodynamic processes occurring inside the earth and their influence on geodetic measurements" Yearbook: Technical Sciences. Volume IX E, Shumen, University Publishing House "Konstantin Preslavski University of Shumen", p. 70–74, ISSN: 1311–834X.

Summary: The subject of the study is the dynamics of Earth's rotation in the solar coordinate system.

The main geodynamic processes causing these movements are polar motions, the unsteady rate of daily rotation or change during the day, tidal geodynamic processes, changes in the position of the mass center and axis of inertia, changes in the sea level, changes in the elements of the gravity field. on Earth, etc. To study these movements, the model of the absolutely solid Earth is taken as a starting point.

4. 2019 – **Yanchev, K.**, "Results of monitoring geodynamic processes using modern geodetic methods in the area of the Krupnik geodynamic polygon" Yearbook: Technical Sciences. Volume IX E, Shumen, University Publishing House "Konstantin Preslavski University of Shumen", p. 61–69, ISSN: 1311–834X.

Summary: The purpose of the study is to establish the impact of geodynamic processes on the geodetic measurements and networks. The present paper concerns research and analysis of the local geodetic network designed to monitor the movement of the earth's crust in the Krupnik region and conducting geodetic measurements using Global Navigation Satellite Systems (GNSS). The received results compared with the previous and subsequent measurements will help to obtain comprehensive reliable picture of the event and the nature of modern crustal movements in the area.

5. 2019 – **Yanchev, K.**, "Methods for presenting, processing and interpreting the results of geodetic observations of geodynamic processes" Yearbook: Technical Sciences. Volume IX E, Shumen, University Publishing House "Konstantin Preslavski University of Shumen", p. 55–60, ISSN: 1311–834X.

Summary: The subject of the study is to develop a methodology for investigating the influence of geodynamic processes on geodetic measurements and networks. The developed methodology for monitoring, mathematical processing of the results and reproduction of the different inter-block slip and study of regularities in the change of their state, in the course of their formation, allows to model the movement of the individual blocks and to correctly account the extreme effects of deformation through their influence. on geodetic measurements and networks.

6. 2019 – **Yanchev, K.**, "Analysis of information on the relationship between the parameters and the structure of the fault zones" Yearbook: Technical Sciences. Volume IX E, Shumen, University Publishing House "Konstantin Preslavski University of Shumen", p. 75–80, ISSN: 1311–834X.

Summary: The subject of the study is the availability of information on the structure and parameters of the fault zones. Due to the lack of generally accepted criteria for determining the boundary of the zone of influence in the fault, various features are used, such as: the distance at which the degree of fracture becomes close to the density of cracks in a given array. Depending on the properties of the array, the patterns of change in the density of cracks change substantially and allow for the observation of regularities.

7. 2020 – **Yanchev, K.**, Kirilova, K., "Present studies of the Krupnik geodynamic polygon" Journal of Geodesy, Cartography, Land Management, 1–2'2020 year, Edited by: Union of Surveyors and Land Managers in Bulgaria - FSEU, p. 40–47, ISSN: 0324–1610.

Summary: The subject of the study is to conduct precise GNSS measurements of the Krupnik geodynamic polygon in order to analyze and evaluate the current local geodynamic processes occurring in the fault zones. The study made it possible to define a model of modern local deformations of the crust in the fault zone with appropriate accuracy and representativeness, which will serve as a basis for future studies.

8. 2020 – Kirilova, K., **Yanchev, K.**, "Modelling of geoid in extreme areas from the territory of the Republic of Bulgaria - Rila mountain" Journal of Geodesy, Cartography, Land Management, 1–2'2020 year, Edited by: Union of Surveyors and Land Managers in Bulgaria – FSEU, p. 3–20, ISSN: 0324–1610.

Summary: The subject of the study is to create a model of the geoid in local areas from the territory of the Republic of Bulgaria and mainly in the mountainous and highland areas, where topographic effects completely dominate the local variations of the gravitational field. The study made it possible to define a geoid model in mountainous areas with highly rugged terrain with appropriate accuracy and representativity to serve as a height reference surface, as well as a basis for deriving more accurate local geoid models.

9. 2020 – **Yanchev, K.**, "Selection of appropriate geodetic equipment for reception of gnss signals when conducting high-precision measurements", Journal scientific and applied research, licensed at EBSCO, USA. Volume 18, 2020, ISSN: 1314–6289.

Summary: The subject of the research is to make the right choice of GNSS receiver and related equipment, which will allow to achieve the required accuracy and high productivity with minimal material costs when conducting high-precision geodetic measurements.

10. 2020 – **Yanchev, K.**, "Method for conduct high-precision geodesic measurements using gnss systems", Journal scientific and applied research, licensed at EBSCO, USA. Volume 18, 2020, ISSN: 1314–6289.

Summary: The subject of the research is the conduct of geodetic measurements and mathematical processing of the results of these measurements, together with mathematical models and data from measurements

of geodynamic processes in order to eliminate the known influence of observed global and regional geodynamic processes on geodetic measurements and networks and to take into account the influence of local geodynamic processes on them.

11. 2020 – Yanchev, K., “Presentation of horizontal movements of the earth's crust by results of geodesic measurements”, Journal scientific and applied research, licensed at EBSCO, USA. Volume 19, 2020, ISSN: 1314–6289.

Summary: The subject of the study is to present a modern model of local horizontal movements of the Earth's crust in a fault zone with appropriate accuracy and representativeness through the results of precise GNSS measurements on a geodynamic site to analysis and evaluation of modern local geodynamic processes occurring in fault zones.

Data:12.10.2020
City of Shumen

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