Co-funded by the Erasmus+ Programme of the European Union

Portfolio for doctoral students

Information on doctoral student:

- First and last name **Maksym Martyniuk**
- Structural unit (department, institute) **Hydrometeorological Institute OSENU**
- Curriculum title **Earth Sciences, Hydrology.**

General information on studies:

- Thesis title in English and in local language **Floods on the rivers of the Vistula basin within Ukraine, methods for determining their characteristics and risk assessment (Повені на річках басейну Вісли в межах України, методика визначення їх характеристик та оцінка ризиків)**
- Supervisor(s) **Valeriya Ovcharuk (Dr of Science, Geography)**
- Curriculum, year of matriculation: **PhD student, 3rd year of matriculation**
- Academic leaves

INFORMATION ON ACADEMIC YEAR NO. 1-3

Status of research work:

- **Overview of performed tests, collected data, field works, content and preliminary results of data processing.**

Maximum runoff data were selected for the Vistula River Basin within Ukraine. Selected data on the maximum water runoff and runoff layers during spring and rain floods from the beginning of observations to 2015 at 23 water gauging stations.

The homogeneity and cyclicity of the maximum runoff data were determined by hydro-genetic methods. To identify quality cycles using smoothing or filtering means, namely, the method of difference-integral curves. Statistical processing of data series of maximum runoff of rain and spring floods was performed. As a result, the standard statistical parameters of the theoretical distribution curves, the depth of runoff and the rare probability of exceeding – once every 100 years - are calculated. The impact of azonal factors on the maximum runoff was excluded, namely: the impact of forests and swamps on the layers of the maximum runoff of rain floods and spring floods was excluded. A modified version of the operator model for determining the maximum runoff of spring floods was used for calculations. Reduction-type formulas were used to calculate the maximum runoff. Runoff layers with a rare probability of exceeding and the duration of the slope influx were calculated. Also maps of isolines of runoff layers of rare probability of excess and duration of a slope influx by means of which it is possible to remove values in any part of the Vistula river basin were constructed.

- **5 most important articles, book chapters etc, with short summary**

1. Hadush Meresa, Conor Murphy, Rowan Fealy, Saeed Golian. Uncertainties and their interaction in flood risk assessment with climate change. Hydrol. Earth Syst. Sci., 25, 5237–5257, 2021

2. Mészáros, Jakub & Pekarova, Pavla & Pekar, Jan. (2020). Estimation of discharge with long return period using historical flood records. Acta Hydrologica Slovaca. 21. 19-28. 10.31577/ahs-2020-0021.01.0003.

3. Ibanga, O. A., & Idehen, O. F. (2020). GIS-Based Climate Change Induced Flood Risk Mapping in Uhunmwonde Local Government Area, Edo State, Nigeria. International Journal of Environment and Climate Change, 10(9), 8-23. https://doi.org/10.9734/ijecc/2020/v10i930225

4. Rottler, E., Francke, T., Bürger, G., and Bronstert, A.: Long-term changes in central European river discharge for 1869–2016: impact of changing snow covers, reservoir constructions

and an intensified hydrological cycle, Hydrol. Earth Syst. Sci., 24, 1721–1740, https://doi.org/10.5194/hess-24-1721-2020, 2020.
5. Neuhold, Clemens & Stanzel, P. & Nachtnebel, Hans. (2011). Integrating River Bed Dynamics to Flood Risk Assessment. 10.5772/20307.

Meetings with supervisors:
- **Date, place –** as needed, at the OSENU or remotely
- **Main topics, tasks –** Topics related to the calculations of the maximum runoff of the study area

Courses completed during academic year:
- **Name of subject, Volume ECTS, University**
- The Summer School Green & Blue Infrastructure in a Post-Communist City: Exploring Legacies and Developing Innovation, held on 13-27 September in Yaremche, Ukraine. (6 ECTS)
- 1st Erasmus+ ClimEd Training (online) on Competency-Based Approach to Curriculum Development for Climate Education (19 Arpil – 12 May 2021) (3ECTS)
- 3rd Erasmus+ ClimEd Training (online) Digital tools and datasets for climate change education (26 October – 12 November) (3 ECTS)

Performance at conferences:
- Maksym Martyniuk, Valeriya Ovcharuk. The modern method for calculating the maximum river runoff on the Vistula River Basin within Ukraine // INTENSE Open Science Conference Online/Tartu, Estonia, "Socio-ecological resilience across Eurasia innovation for sustainability transition" 5-7 October 2021, 21 – 22 pp. (Oral presentation)
- Maksym Martyniuk, Alina Hrechko, Oksana Lenevych. SEWAGE TREATMENT PLANTS IN SMALL TOWNS OF UKRAINE // INTENSE Open Science Conference Online/Tartu, Estonia, "Socio-ecological resilience across Eurasia innovation for sustainability transition" 5-7 October 2021, 19 – 21 pp. (Oral presentation)
- Maksym Martyniuk, Valeriya Ovcharuk. Application The Space Techniques To Measure The Area Forestation And Wetlands At The Basin Of The Vistula Within Ukraine // 4th Hydrospace-GEOGloWS 2021. (7-11 June 2021, Virtual event) (Poster)
- Martyniuk MO, Ovcharuk VA. Substantiation of the parameters of the calculation method for determining the maximum flow in the Vistula river basin // Second All-Ukrainian Hydrometeorological Congress: abstracts. Odessa: Odessa State Ecological University. 2021. 75 – 77 pp. (Oral presentation)
- Martyniuk MO, Ovcharuk VA. Visualization and description of boundary modules of slope inflrч during floods in the Vistula river basin // Proceedings of the XX scientific conference of young scientists of Odessa State Ecological University, April 26-30. Odessa: ODEKU. 2021. 79 – 82 pp. (Oral presentation)
- Bolshakov VN, Sitov VN, Martinyuk MO, Sokolov EV. A simple method for determining the transparency of the atmosphere // Second All-Ukrainian Hydrometeorological Congress: abstracts. Odessa: Odessa State Ecological University. 2021. 153 – 155 pp. (Oral presentation)

Articles published:
- **Articles in Web of Science and/or Scopus-indexed journal**
- **Articles in international publications**
- **Articles in national publications**
- Gopchenko ED et al. Modern methods of studying the maximum runoff of spring floods and rain floods of rivers of Ukraine // Scientific Bulletin of Kherson State University. 2019. Vol. 10. 114-118 pp.

Activity plan for the next academic year

- Development and testing of methods for risk assessment of spring floods and rainwater floods in the Vistula River basin within Ukraine.
- Carrying out risk assessment in the studied basin.
- Writing an article based on research results.

Doctoral student **Supervisor**

22.11.2021 Valeriya Ovcharuk