

Hydrology of small forested microwatersheds I

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Content

1. Forest Training Enterprise MF Krtiny
2. Experimental microwatershed and climate microstations nets
3. What we do there?

Forest Training Enterprise MF Krtiny

History

- the oldest training estate in the sector of the CR Ministry of Education
- established in 1923 mainly for Faculty of Forestry and Wood Technology support
- was founded by one of the first MENDELU rector, Professor in forest management Rudolf Haša (1881-1963)

Forest Training Enterprise MF Krtiny

History

- at the time of German occupation (1939-1945) was renamed to Training Forest Farm
- after war Training Forest Farm was renamed back to Training Forest Enterprise
- after 1989, the Enterprise is focused on forest management, improvement of demonstration teaching objects for students of forestry disciplines and later also landscape engineering

Forest Training Enterprise MF Krtiny

Present time – natural conditions

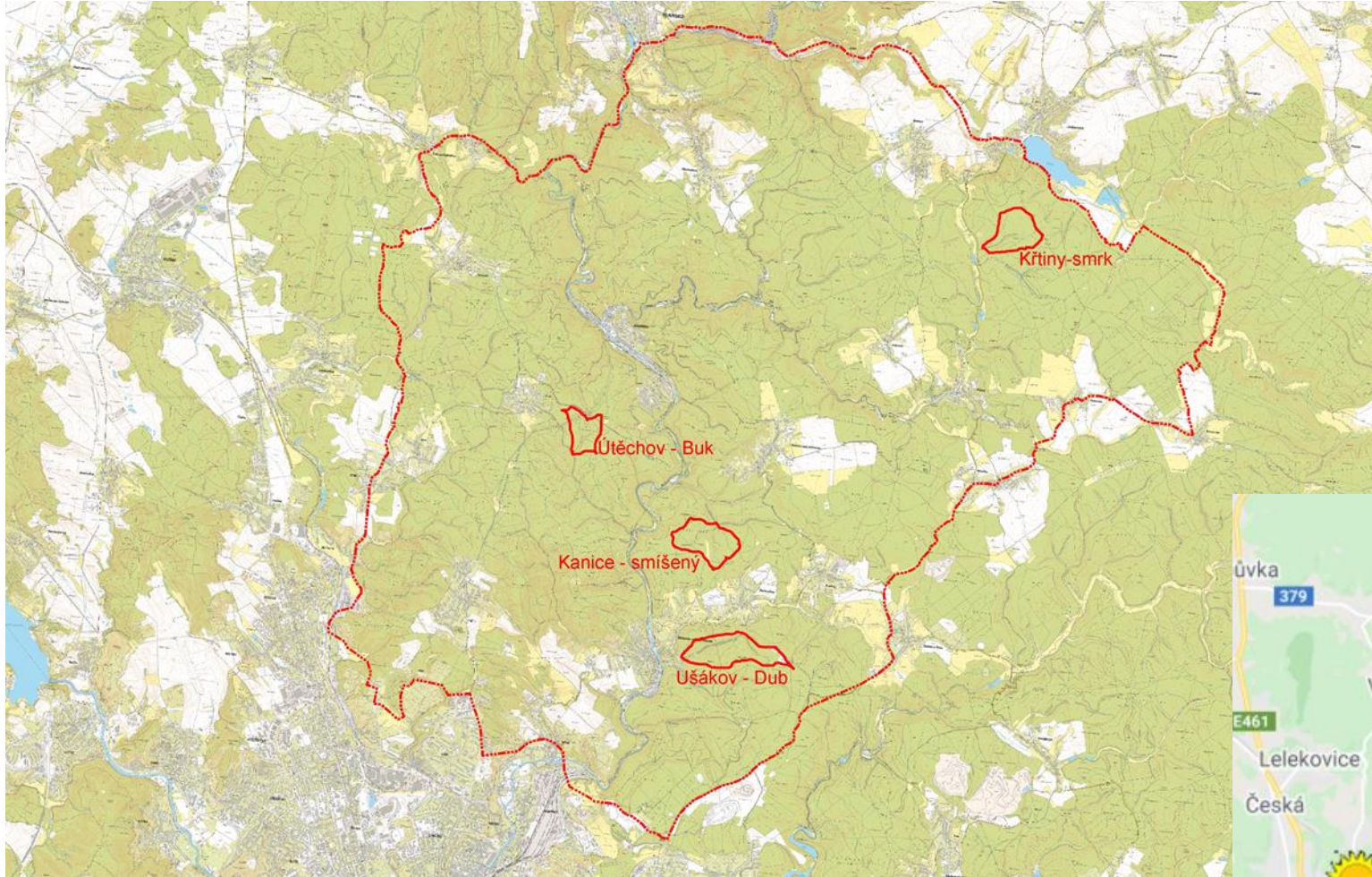
- area over 10,500 ha
- altitudes ranging from 210 to 575 m a.s.l.
- dominated mostly by mixed forests with 46% of coniferous- and 54% of deciduous tree species revealed 116 forest types situated in 4 forest altitudinal vegetation zones
- mean annual temperature of 7.5 °C and mean annual precipitation of only 610 mm

Forest Training Enterprise MF Krtiny

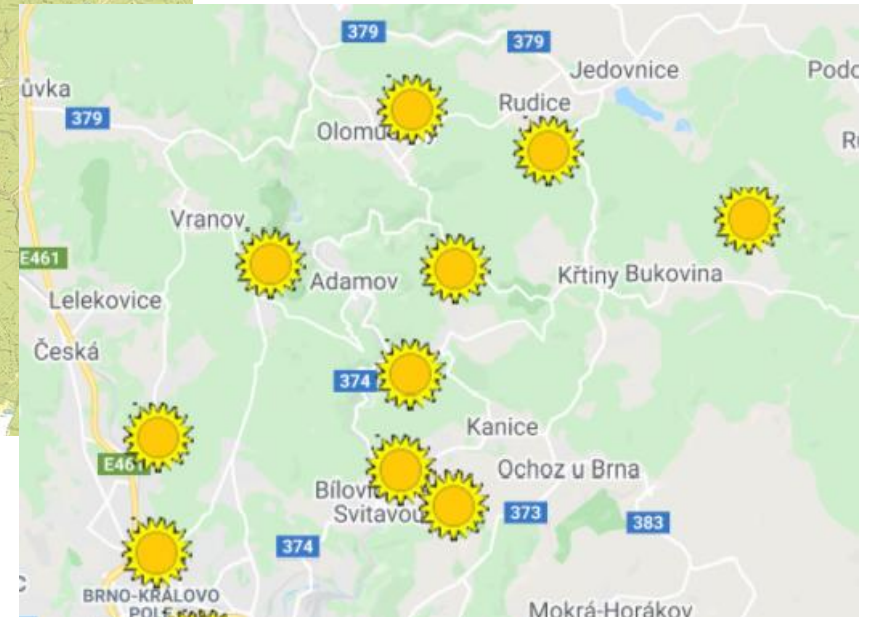
Present time – natural conditions

- parent rock formed by granodiorites, Culmian grawacks and limestones
- main tree species - spruce, pine, larch for conifers and beech and oak for broadleaves
- application of mild forest management methods with a minimum of clearcuts and with the use of natural regeneration

Microwatersheds and climat microstations

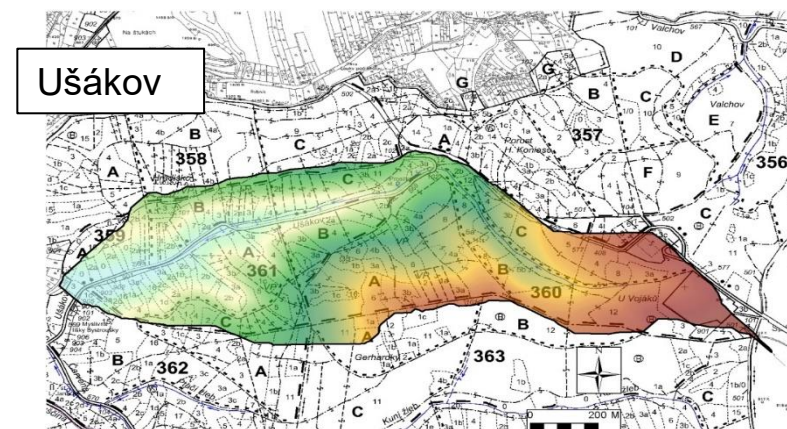
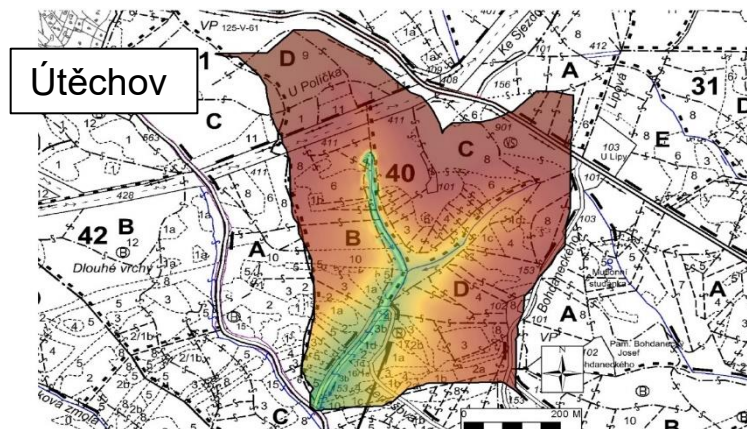
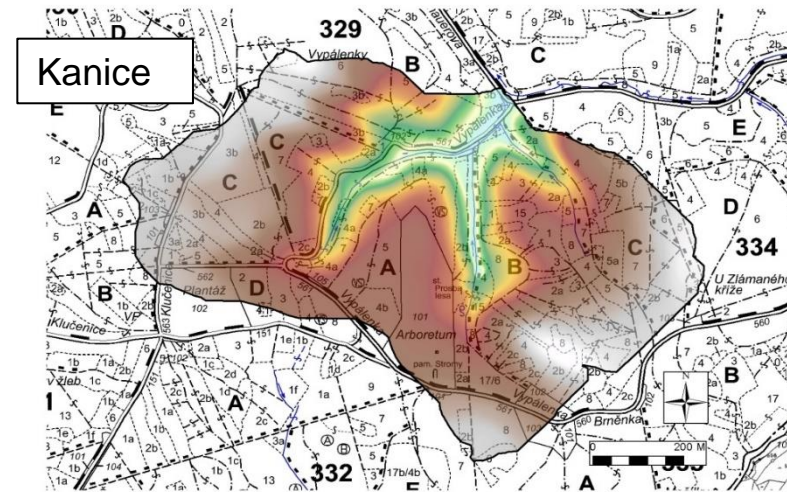
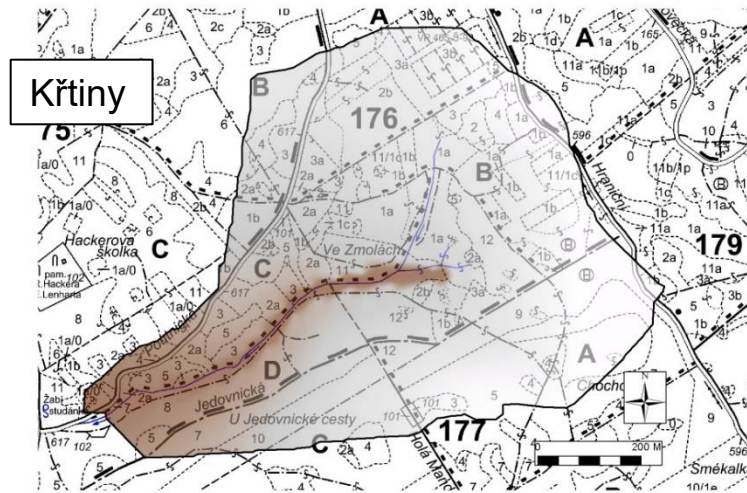


<http://www.amet.cz/>



<https://stanice.fiedler-magr.cz/>

Microwatersheds - situations



Microwatersheds – basic characteristics

Basic characteristics	Křtiny	Kanice	Útěchov	Ušákov
Area (ha)	57	65	38	82
Main recipient length (m)	940	640	660	1850
Max. altitude (m asl)	563	371	325	439
Min. altitude (m asl)	456	287	452	220
Mean altitude (m n m)	521	341	411	350
Exposure	south	north	southeast	east
Mean slope inclination (%)	21	17	38	26
Forest cover (%)	100	98	100	98
Main tree specie	Spruce	Mixed <small>(BK29, DBZ20, BO19, HB17, MD15)</small>	Beech	Oak

Equipment



Data

1. Climatic data

- Temperature, precipitation, air humidity, wind direction and speed, solar radiation, soil temperature 5 and 10 cm depth, soil moisture 10 – 30 cm

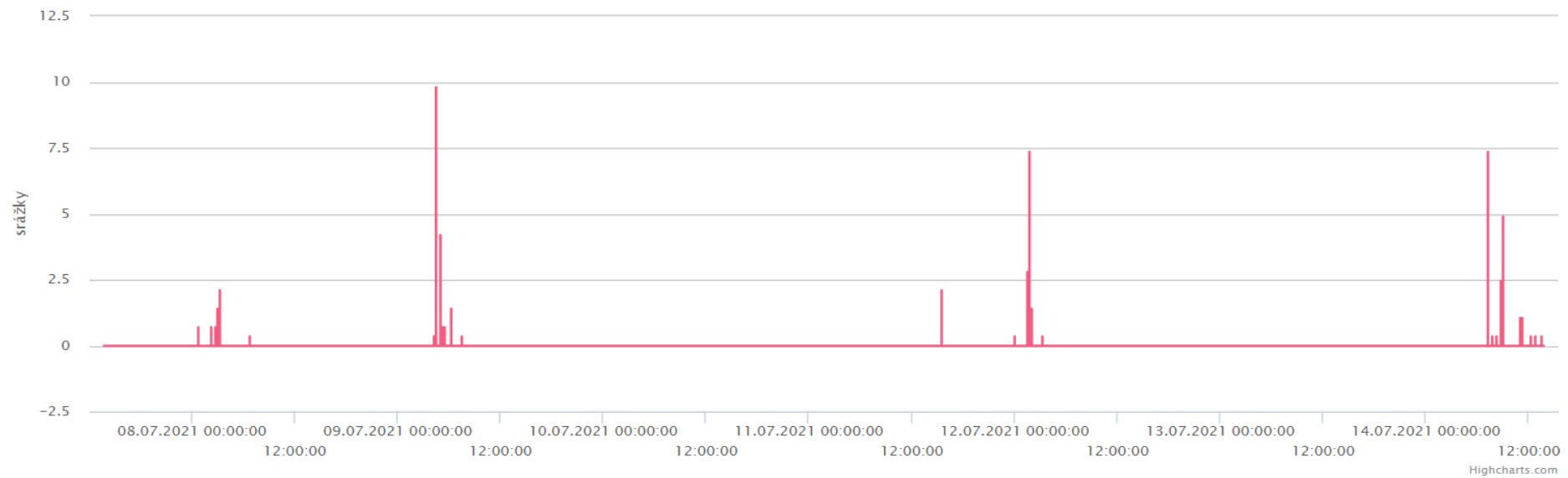
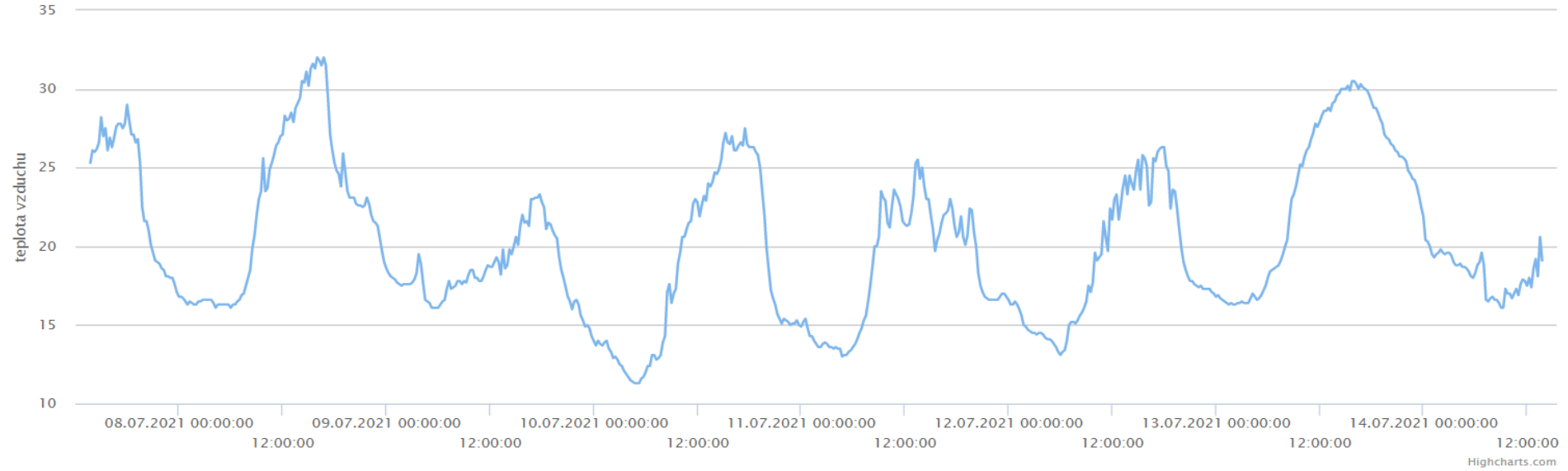
2. Hydrological data

- Water level – stream flow, run-off

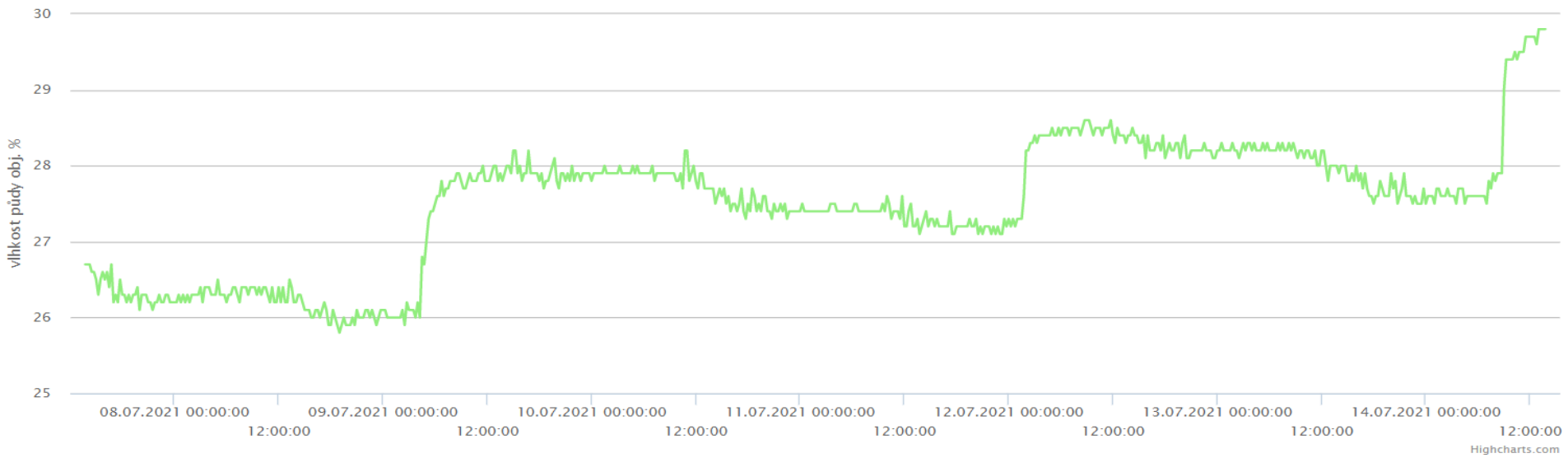
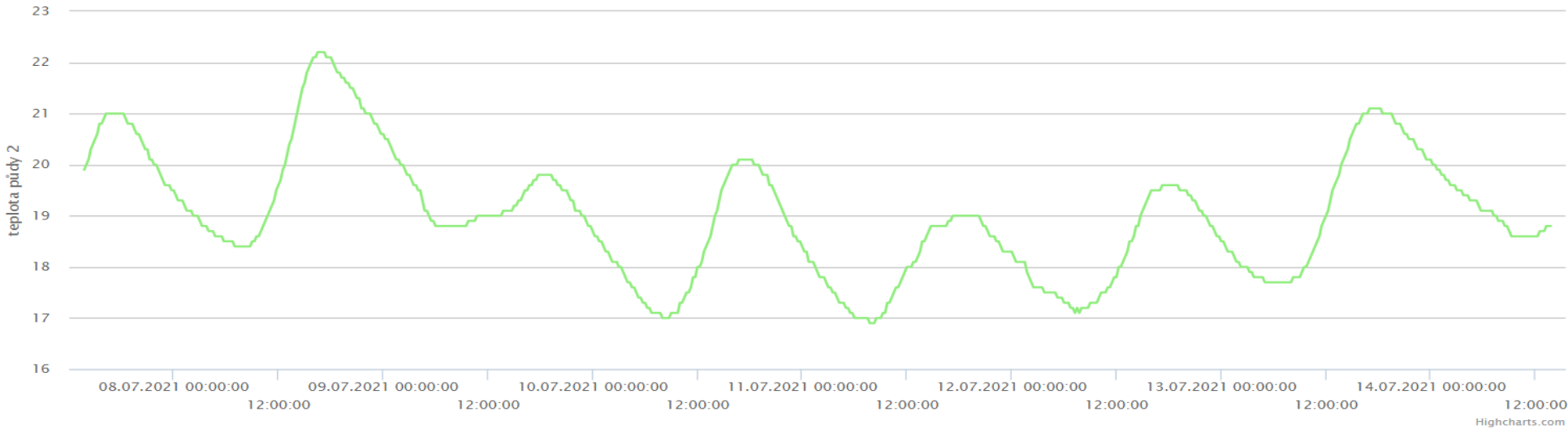
3. Evapotranspiration

- Sap flow

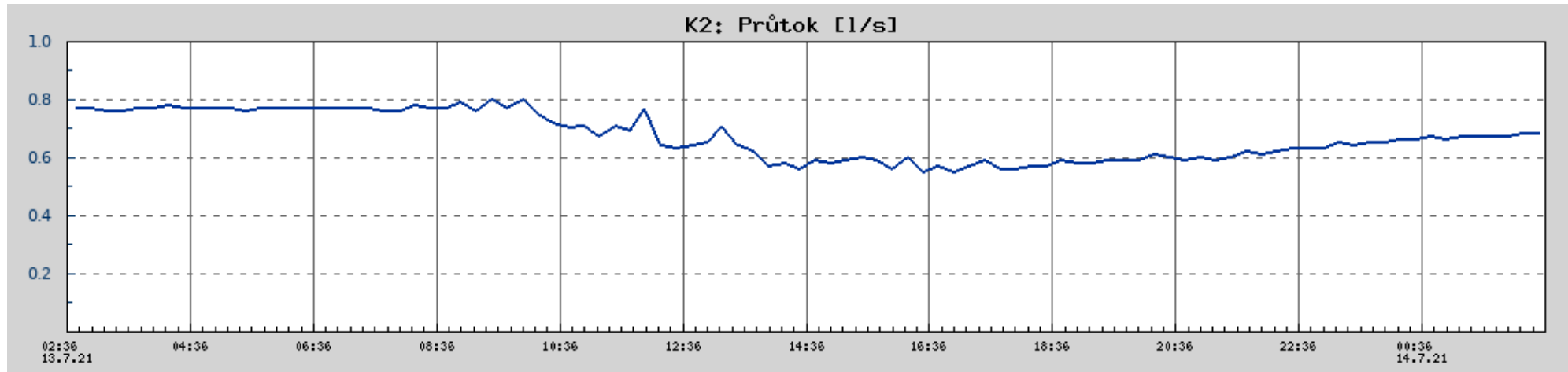
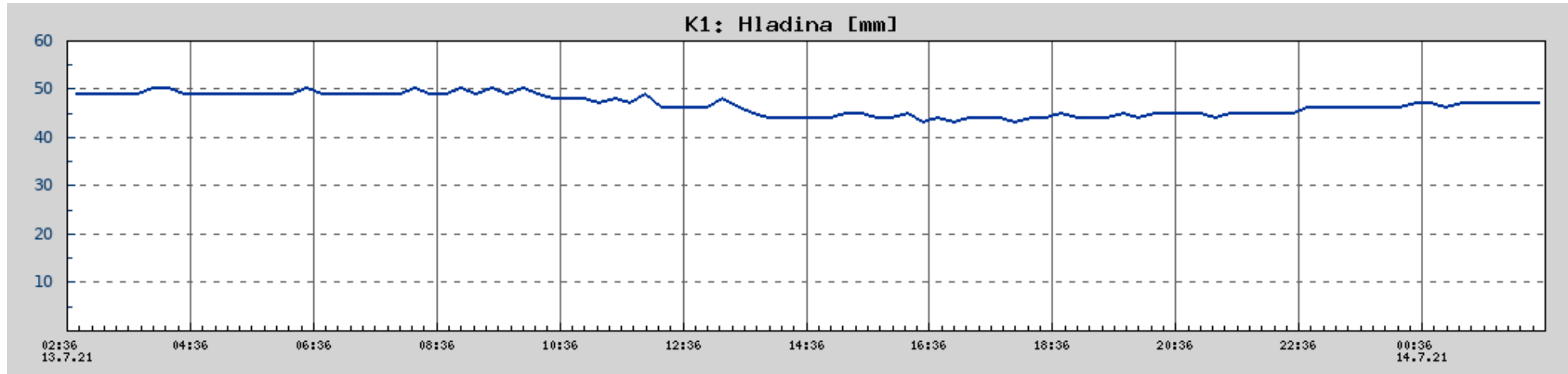
Data



Data



Data



Methodology

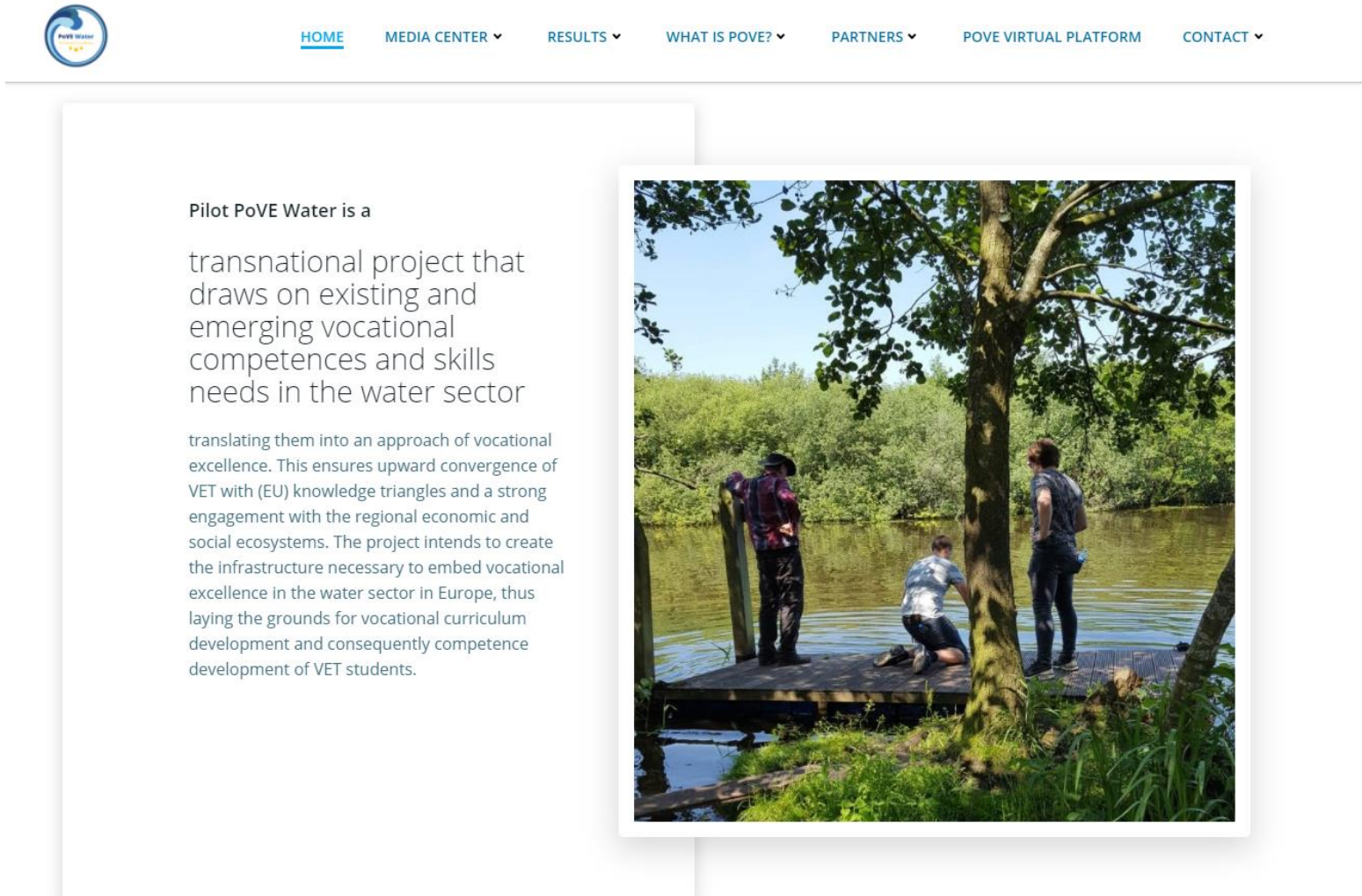
- Net of stabilized **experimental catchments**
- Net of **automatic climatological stations** – data logged in interval of 60 minutes
- **Stream-flow measurement** – Thomson spillways (weirs), press or ultrasound sensors, data logged in interval of 15 minutes
- Additional measurements – sap flow, soil moisture, surface runoff, throughfall etc.
- Fully automated – send data virtually to the web page



Projects

International

1. **PoVE Water – „Platform of Vocational Education“**
(<https://www.povewater.eu>),
Erasmus + project „Sector Skills Alliances“.
2. **iWatermap** – Interreg Europe project – focused on evaluation of the human resources, companies and internationalization potential in water sector in frame of South Moravian region
3. **Water Smart Territories** COST activity connect the South Moravian Region to the Water Smart regions of Europe




The screenshot shows the website for PoVE Water. At the top left is the PoVE Water logo. To its right is a navigation menu with the following items: [HOME](#), [MEDIA CENTER](#) (with a dropdown arrow), [RESULTS](#) (with a dropdown arrow), [WHAT IS POVE?](#) (with a dropdown arrow), [PARTNERS](#) (with a dropdown arrow), [POVE VIRTUAL PLATFORM](#), and [CONTACT](#) (with a dropdown arrow). Below the navigation menu is a large white box containing text. On the right side of this box is a photograph of three people on a wooden dock by a river, looking at something in the water. The text in the box describes the Pilot PoVE Water project as a transnational project that draws on existing and emerging vocational competences and skills needs in the water sector, translating them into an approach of vocational excellence. This ensures upward convergence of VET with (EU) knowledge triangles and a strong engagement with the regional economic and social ecosystems. The project intends to create the infrastructure necessary to embed vocational excellence in the water sector in Europe, thus laying the grounds for vocational curriculum development and consequently competence development of VET students.

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Projects

National – research

- 1. Water balance of forest microwatersheds** – On the principle of comparing the inputs and outputs (precipitation versus runoff and evapotranspiration), all in continual intraday-long-time measurement – 4 stabilized experimental catchment, 2 – 3 conditionally functioning
- 2. Forest management adaptation of the global change effect** – project supported by national grant agency projekt typu NAZVa – focused on water saving measures in landscape and forests
- 3. Effect of tree species composition and forest structure on the microclimate and hydrology of the landscape** – focused on the effects of the different forest types on the parameters and values of water balance

Projects

National – applied

- 1. Adaptation measures for water retention in forests in the territory of FTE ML Křtiny** - a project of the type "Norwegian Funds" - is focused on the specification of measures for water retention in forests in the territory of FTE ML Křtiny, basically there are three levels - 1) large investment projects in the range of approx. 5 - 10 mil CZK - approx. 4 on the territory of ŠLP, 2) smaller type technical and biotechnical measures (eg. ponds, ravine protection, etc.), 3) vegetation detail measures - in connection with the new FMP



Projects

Prepared

1. **Technical drainage equipment** - NAZVa (national grant agency) type project - submitted this year - seepage pits on forest road culverts and their positive or negative impact on water in forests
2. **Water4all - Horizon project** - in cooperation with SMR "Natural Laboratories"

TFE ML Křtiny – Natural Laboratory „Water retention in forests“

Base: description of the parameters of water balance

Water retention measures proposal

Water retention measures implementation

Water retention measures effect modelling

Water retention measures effect assessment

Water retention measures demonstration – professionals and non-professionals

**Thank you for your
kind attention**

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