

Goldschmidt 2011 Trip E (low temperature, post-conference), August 20, 2011

ENVIRONMENT WEST “The Lysina Catchment Critical Zone Observatory (CZO) and Associated Study Sites”

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Scientific Content

The Lysina CZO and nearby sites are some of the most intensively researched crystalline catchments in the world, to study the impact of acid deposition and other airborne pollution on soils and streams.

A historical and ongoing focus of research is the study of low temperature geochemical processes in contrasting lithological settings. The studied processes include weathering and soil formation, biogeochemical cycles of managed forests, and the impact and recovery of terrestrial and aquatic systems from atmospheric deposition of industrial pollution.

The site is one of four CZOs as part of the European Commission project Soil Transformations in European Catchments (SoilTrEC, www.soiltrec.eu). Catchment- and soil profile- scale studies at the site aim to provide the essential data to develop integrated mathematical models of the Critical Zone. These models are to describe the linked functions of soil to produce crops (timber in this case), attenuate pollution loads to aquifers and streams, store carbon, provide habitat and maintain biodiversity.

A key output from the project is forecasting methods for soil processes and ecosystem services that can be used to assess future scenarios of environmental change and impacts on soil. These models will also help design land use measures to mitigate against climate change and other pressures on terrestrial and aquatic environments.

Itinerary

Departure at 8:00am, return at 9:45pm, ending at the Prague Congress Centre. Pre-arranged accommodation in Prague after the return from the field trip is necessary. Maximum 40 people. The cost includes a lunch bag, a hotel buffet dinner and a guide booklet. Total length of the road trip to the Slavkov Forest (Map 1) is almost 500 km. Total walking distance is about 6 km in the altitude from 600 to 900 m asl. Sunrise at 5:58am, sunset at 8:11pm in Prague.

*Three geochemically contrasting small catchments in the Slavkov Forest (Slavkovsky les) will be visited during the scientific part of the field trip. The catchments are situated 5-7 km apart, with similar forest cover of Norway spruce (*Picea abies*), but underlain by contrasting silicate bedrocks. They serve as the Czech critical zone observatory (Kram and Hruska 2011, Goldschmidt Conference abstract).*

Stop 1 – Kynzvalt Chateau. Remodelled between 1820 and 1833 in the style of Viennese Classicism (Empire). Summer seat of Mr. Metternich, the State Chancellor of Austrian Habsburg Monarchy in 1821-1848. View of the chateau from the outside (Fig. 1). Short coffee break and possibility to use of a bathroom inside the chateau.

Stops 2a and 2b – Lysina Critical Zone Observatory. Small catchment (0.27 km²) underlain by base-poor granite, forested by Norway spruce stands (Fig. 2a, b, c). Studied since 1988. Major site of the SoilTrEC project financed by the European Commission (2009-2014).

Chronically acidic streamwater with prevailing ions Ca-Na-SO₄-Org. It is possible to see a medieval pond, small brooks, V-notch weirs, soil lysimeters, and soil pits (with Podzol profiles, extremely low base saturation). Total length of the trails at Lysina is 0.5 km.

Stop 3 – Pluhuv Bor. Small catchment (0.22 km²) underlain by Mg-extremely rich ultramafic serpentinite, forested mainly by Norway spruce stands and partially by Scots pine (*Pinus sylvestris*). Studied since 1991. Slightly alkaline streamwater with prevailing ions Mg-HCO₃-SO₄-Org. It is possible to see a small brook, V-notch weir (Fig. 3a, b), throughfall and bulk precipitation collectors, soil lysimeters, and soil pits (with Stagnosol profiles, extremely high base saturation). Total length of the trail at Pluhuv Bor is 3.5 km with the elevation difference of 150 meters.

Stop 4 – Stinker National Nature Reserve. Standing acidic surface water with effluents of gaseous H₂S and CO₂ by postvolcanic activities in spruce forest (Fig. 4). Length of the trail 0.5 m.

Stop 5 – Na Zelenem. Small catchment (0.55 km²) underlain by base-rich mafic amphibolite, forested mainly by Norway spruce stands (Fig. 5). Studied since 2001. Neutral streamwater with prevailing ions Ca-Mg-Na-SO₄-HCO₃. It is possible to see a small brook, a V-notch weir, throughfall collectors, and soil pits (with Cambisol profiles, medium base saturation). Total length of the trail at Na Zelenem is 0.5 km.

Stop 6 – Marienbad (Mariánské Lázně) – Spa Town. Founded in 1808, it is a mosaic of art deco buildings and parks, surrounded by spruce and beech forests (Fig. 6). The town's golden era was in the second half of the 19th century when many celebrities and rulers came to enjoy the curative carbon dioxide mineral waters. It will be possible to taste the Cross spring (total dissolved solids 10 mg L⁻¹, Na-SO₄-HCO₃) with the strongest curative power and better tasting Rudolph, Caroline, and Forest springs (TDS 2-4 mg L⁻¹) and see the performance of the Singing Fountain. Buffet-style dinner in the Grandhotel Pacifik near to the Spa Colonnade.



Map 1. Itinerary of the Prague – Slavkov Forest – Prague field trip.



Figure 1. Kynzvalt Chateau.



Figure 2. Lysina catchment underlain by granite. Fig 2a. A pond immediately below the Lysina catchment. Fig. 2b. V-notch weirs on the main stream during baseflow conditions.



Figure 2c Lysimeter plot in the Norway spruce (*Picea abies*) even-aged stand at Lysina.



Figure 3. Pluhuv Fig. 3a. V-notch weir during spring snowmelt event. Fig. 3b. Stream channel during summer baseflow conditions



Figure 4. The Stinker National Reserve. Standing acidic surface water with effluents of gaseous H_2S and CO_2 generated by postvolcanic activities.

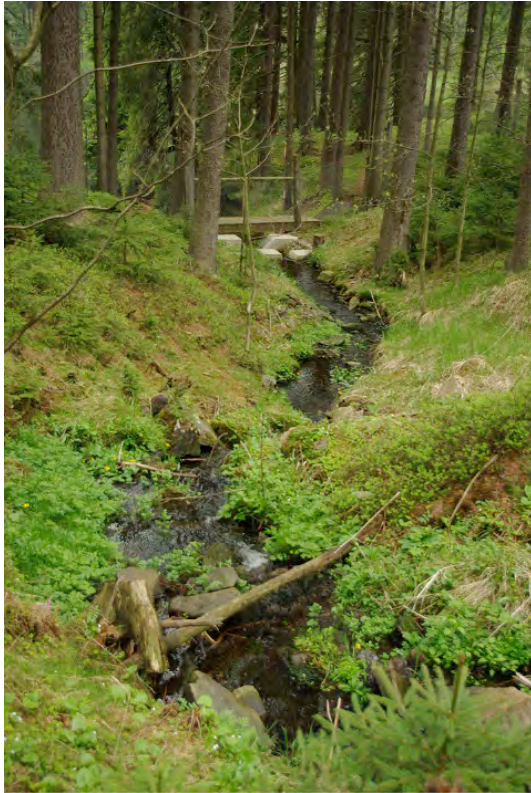


Figure 5. Stream channel at the Na Zelenem catchment underlain by amphibolite.



Figure 6. Marienbad (Marianske Lazne). Fig. 6a. The Singing Fountain, Main Colonnade, and the Cross Spring. Fig. 6b. The Rudolf Colonnade.