

Integrated ecological education in the annual soil-ecological field courses to West Siberia and West Mongolia

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Since 1995, a group of Siberian researchers, with the support of a few German scientists, started to develop a concept and routes for soil-ecological field courses over bioclimatic zones in West Siberia and later in West Mongolia. As a result, following three excursions were evolved (Fig.):

- (1) The **"North"** course starts in the steppe zone nearby the border of Kazakhstan and goes northward through the entire West Siberian Plain (one of the world's largest areas of continuous flatland) up to the southern tundra (above the Arctic Circle);
- (2) The **"South"** course starts southward from the southern taiga throughout the West Siberian Plain via the subtaiga, forest steppe and steppe, and then continues across all altitudinal belts from the tundra to the semi-desert in the Russian Altai mountains;
- (3) The **"Double Wild West"** course starts in the southern part of forest steppe zone, then goes across the Russian Altai mountains to its southern-east corner where most of the glaciers and permafrost areas of this region are located. Then it continues to West Mongolia (Mongolian Altai mountains) up to the stony desert with shifting sand dunes.

All these soil-ecological courses are focused mostly on virgin ecosystems and undisturbed soils or just slightly changed by anthropogenic influences.

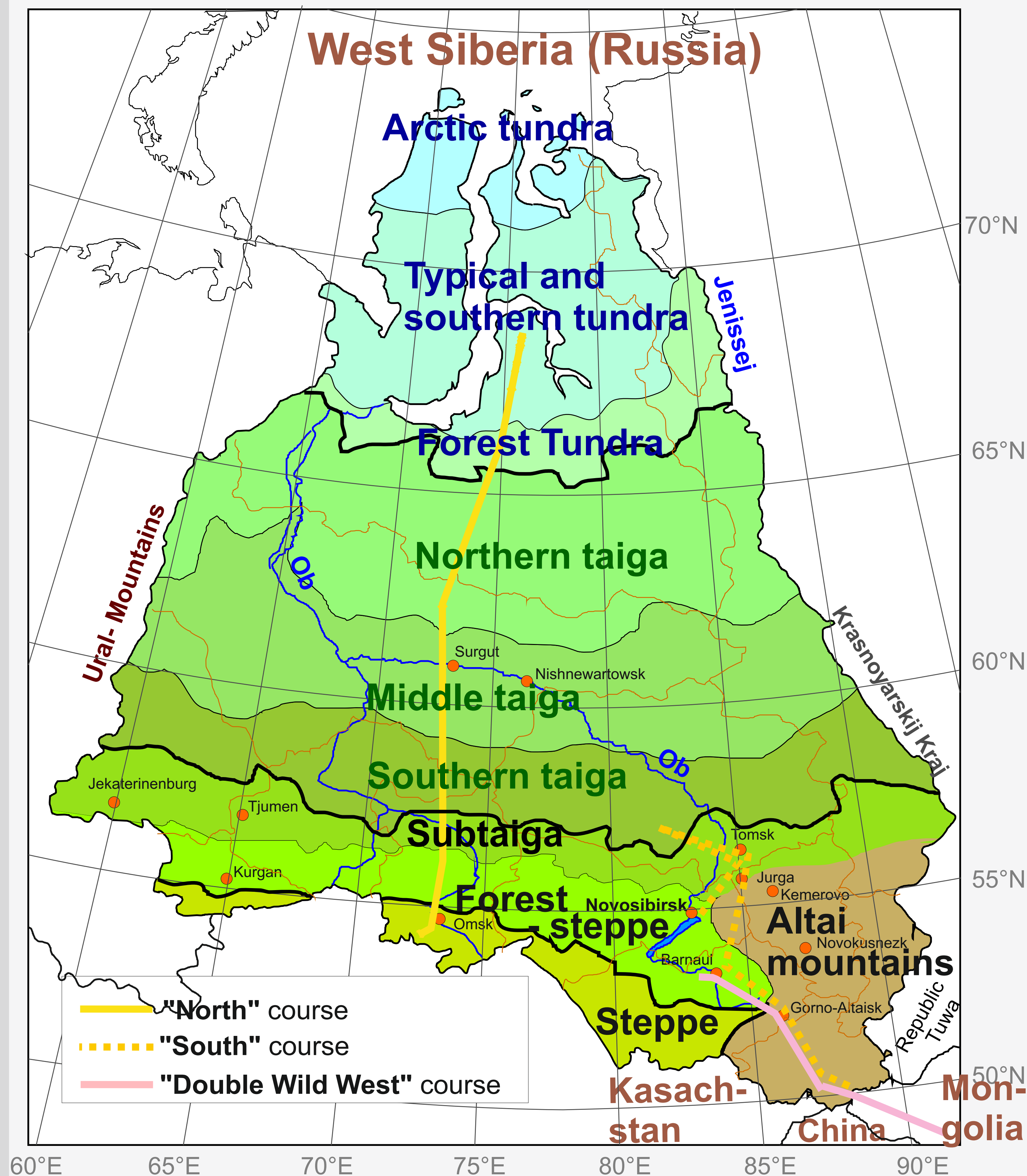


Fig. Routes of three courses along the West Siberian Plain, the Russian Altai mountains and the Mongolian Altai mountains.

Teaching peculiarities

- ▶ All courses are guided by leading Siberian scientists (specialists in soil science, geobotany, geomorphology, and geology), who accompany groups of participants for the entire duration. Experts for specific topics are often invited.
- ▶ Every course includes 17 to 20 key sites where comprehensive information on soil, vegetation, geological substrate, relief and climate is given by the specialists.
- ▶ Teaching takes place in the form of field seminars at the key sites and additional discussions and lectures in the evening.
- ▶ Each participant is provided with a guidebook (up to 100 pages) that contains detailed information on every key site and additional information about what participants are able to see along the routes from the one key site to the next.



The gate from the Russian to Mongolian Alta mountains.

Further information is available by email go2siberia@gmail.com

Please see also:

C. Siewert, P. Barsukov, S. Demyan, A. Babenko, N. Lashchinsky & E. Smolentseva (2014): Teaching soil science and ecology in West Siberia: 17 years of field courses // Environmental Education Research, 20:6, 858-879, DOI: 10.1080/13504622.2013.839778



Vegetation of southern tundra.



Cryoturbated soil in southern tundra.

The courses' goals

- to demonstrate the great diversity of Siberian / Mongolian nature, and to explore various undisturbed (by human activity) inter-relationships between abiotic and biotic ecosystem components (soil, vegetation, geological substrate, relief and climate) under continental climate, seasonal frost and permafrost;
- to show some examples of the influence of agriculture, as well as fires, oil and gas mining;
- to discuss the influence of current climate change and its mitigation as related to the rational use of soil and ecosystems for maintaining soil health and achieving sustainable development of man-made ecosystems;
- to provide interdisciplinary exchange of experience and knowledge, overcoming the language barrier and development of cooperation between Russia and Europe in a broad sense;
- to initiate new research and / or teaching projects.

The courses' organization patterns

- ▶ duration is between 23 and 26 days in July or August on annual basis;
- ▶ transportation (about 3000 km) with excursion buses and a truck for baggage;
- ▶ accommodation in tents right nearby rivers or lakes at scenic sites;
- ▶ accompanied by a Russian service team (incl. professional cooks) who give us independence and flexibility from outside facilities.

Conclusion

We believe that our experience in teaching in the form of field seminars conducted in natural ecosystems, as well as other specific organizational methods and collaborative approaches, can be used to facilitate similar educational events in other regions of the world to support the future sustainable use of local natural and human resources. *In situ* visualization of the fact that soil-forming factors play an integral role in combining and explaining various ecosystem components should be considered the most important feature of the field courses, along with the interdisciplinary approach.



Teaching at the campsite on the shore of Tolbo lake, Mongolia.

Teaching in mountain tundra of the Russian Altai.



One of 1500 glaciers of the Russian Altai.



Suggestions for collaboration

We invite European students and researchers for participation in soil-ecological courses in West Siberia and Mongolia by several possible ways:

- (A) as individual students and scientists from different countries and institutions;
- (B) as a group of students/young scientists from one university, possibly together with Professor(s) of this university;
- (C) as a group of students/young scientists from one or more universities under the leadership of Professor(s). The latter organizes its educational event in Siberia/Mongolia based on the program of one of our courses and with our comprehensive assistance.