Appendix I. Methodological approach

The methodological approach was described in my previous papers and in sections 1-2 of Annexes A-C, but this is not a very detailed account of what happened in the field or in the laboratory (just the basics for professionals). Because one of the reviewer's suggested, unfairly, that the research strategy was not very well presented, the following lines will provide a general description of the field and laboratory analyses carried for the MidPrut and MidDn research perimeters (Annexes A-C). However, this presentation is intended only to satisfy the reviewer's recommendation and not as a proof of concept or for didactic purposes.

1. FIELD WORK

The field surveys were carried by car and by foot, having broadly predetermined paths (areas to be checked) and specific objectives based on the pre-field documentation. The objectives and routes were planned based on the pre-field preparation and documentation, which included: a) the review of the geological bibliography regarding the geological context and the occurrence of knappable siliceous rocks in the study area; b) the correlation of the geological and topographic maps of the area with the reviewed information in order to determine physical locations to be checked during the field surveys. The field surveys had two major goals: (1) assessment of the occurrence of knappable siliceous rocks in the study area; (2) assessment of the geological and geomorphological context of the study area.

Hence, the field surveys from the two study areas (Annexes A-B) were carried in such a way as to locate the primary and secondary deposits with siliceous rocks mentioned in the archaeological and geological literature, but also those not cited. All stops (observation and sampling locations) and survey routes were recorded with a handheld GPS (Garmin eTrex 35, accuracy of max. 3 m). All relevant information regarding the geological context for each stop was recorded in the field notebook, and summary details in the GPS device. The field surveys from 2021 on the Middle Prut valley were carried together with M. Brandl and M. Händel (Austrian Archaeological Institute, Austria), and the ones on the Middle Dniester Valley together with M. Händel.

Although at some stops, there was no sampling carried out, information was recorded regarding the general geological context or the absence of the targeted siliceous rocks. At secondary occurrences, such as gravel bars or scree, the samples would be photographed before they were put in a bag which was labelled with the name of the respective sampling location. Details regarding their context would be recorded in the field notebook and in the GPS device. At primary outcrops, after observing the geological situation, the sampling would be performed as detailed as possible in order to cover the entire stratigraphic sequence, but also the macroscopic variability of the materials encountered. Then, samples would get an ID and their position recorded on the stratigraphic sketch from the field notebook, photographed before extraction, their ID marked on them (or just on the bag) and put in a plastic bag of an appropriate size. Also, the orientation of the samples was recorded in relation to the top and the bottom of the geological layer. Such samples would be marked with an arrow, where the thick base indicates the bottom of the layer and the point of the arrow the top of the layer. The oriented samples would be indicated as such on the sketch from the field notebook (they are illustrated as such in the stratigraphic columns in Annexes A-B). Durin the field work, qualitative data (observations and so forth) was also collected for the materials encountered in the study areas: mode of occurrence, nodule/block size and shape, type of cortex, knapping qualities, and abundance.

2. LABORATORY WORK

The method employed for the characterisation of the rocks gathered during the field survey is the petrographic analysis. The petrographic characterisation includes: a) the macroscopic examination of all geological hand specimens collected during the field surveys (in Annexes A-B) and of all origin control samples from origin sites (Annex C); b) the microscopic analysis of water-immersed unprepared subsamples and thin sections of representative geological materials (in Annexes A-B); c) the microscopic analysis of water-immersed thin section witnesses and thin sections from the origin sites (Annex C). The petrographic analysis was carried between January 2022 and February 2026 at the Petroarchaeology Laboratory of the "Vasile Pârvan" Institute of Archaeology in Bucharest.

The macroscopic examination (naked eye, hand lens) was accomplished by recording the external (colour, type and consistency of cortex/rind, and naked eye visible fossils) and the internal (type of fracture/break, light transmittance, lustre, colour and play of colours, absence or presence and distribution of inclusions, visible fossils or their absence) traits of each hand specimen, thus providing general-propose characterizations and broad rock categories, but also information regarding the size and shape, type of cortex.

After the macroscopic analysis, the hand specimens were divided in subsamples necessary for the microscopic examination (unprepared subsamples for the stereomicroscope, thin sections). The microscopic study focused on covering as best as possible the distribution of the samples by geological contexts, their distribution in the stratigraphic sequence from key sampling points, but also their macroscopic variability. Hence, for many hand specimens, both unprepared subsamples for the stereomicroscope were extracted and thin sections[1] were prepared. In some cases, two thin sections were prepared for one hand specimen (oriented in a different plane than the other, or covering different parts of the hand specimen). For many samples, two or several (up to eight) flakes were extracted for the stereomicroscope examination, each considered as a unique subsample when it was oriented differently (at an oblique or perpendicular angle in relation to the previous one) or covering different parts of a larger sample. Which is why, the actual number of analysed subsamples (unprepared subsamples for stereomicroscope and thin sections) is larger than the number of samples included in the microscopic analysis (for numbers, see Tabs. 6, A7-A8, B7-B8, C2).

The unprepared subsamples were examined in reflected light, immersed in water (just below their surface), under a Nikon SMZ 800N trinocular stereomicroscope with body zoom of 1-8× equipped with two objectives (Plan Apo 1× and P-ED Plan 2×) on a P-RN2 nosepiece and eyepieces of 10× (with a reticule micrometre), thus providing magnifications ranging from 10× to 80×, respectively 20× to 160×. The source of the reflected light is a Nikon C-FDF flexible double arm fibre illumination unit. The thin sections were analysed in transmitted light under a Nikon Eclipse E200 Pol trinocular petrographic microscope equipped with achromat objectives of 4×, 10×, 20× and 40× and eyepieces of 10× (with a reticule micrometre), thus providing magnifications ranging from 40× to 400×. Routinely, the examination of unprepared subsamples was done at magnifications ranging from 10×/20× to 40×/80×, rarely above 100×. Thin section examination was constantly carried at magnifications of 40× and 100×.

Photomicrographs of the thin sections and unprepared subsamples were taken with a Nikon D5600 DSLR camera mounted on the above-mentioned microscopes. The phototube of the Nikon SMZ 800N has an F-Mount adapter and a magnification of 2.5×, which multiplied by the magnifications of the objectives and body zoom provide the possibility of taking microphotographs at magnifications ranging from 2.5× to 20×, respectively 5× to 40×. The phototube of the Nikon Eclipse E200 Pol has an F-Mount adapter and a magnification of 1×, which multiplied by the magnifications of the objectives provide the possibility of taking microphotographs at magnifications ranging from 4× to 40×. Most often, photomicrographs were taken at magnifications of 4×/5× and 10×, only occasionally using the maximum magnifications (for details of microfossils or other particles in the sample). The large majority of the samples used in the microscopic analysis were documented photographically under the microscopes.

Photomicrographs of the samples at wider angles and lower magnifications than those supported by the microscopes (0.5× and 1×) were taken with a so-called macro lens (Nikon AF-S VR Micro-Nikkor 105mm f/2.8G IF-ED objective) mounted on the Nikon D5600 DSLR camera, which was attached on a copystand (Kaiser RS 2 XA Camera Stand). Images in plane polarized light (PPL) and cross-polarized light (XPL) of the thin sections were obtained by placing a sheet of polarizing film under the thin section and a circular polarizing filter (Schneider B+W Circular polarizing filter 62mm) on the macro lens, using a lightbox (Kaiser Fototechnik 2423 Prolite Basic 2 HF) as a source for the transmitted light. The unprepared subsamples in water immersion were photographed in reflected light (RL) from neutral light source (a Godox LEDP-260C Bi-Color LED Video Light mounted on Dynaphos compact stand, but also four Manfrotto Lumimuse 3 LED video light mounted on four mini-tripods). Thin sections were also scanned with a high-resolution scanner (Epson Perfection V550 Photo A4). Images in PPL and XPL were obtained by using two sheets of polarizing film positioned above and under the thin section. Images in RL were obtained by putting the thin section directly into the scanner. Photographs of the thin sections at 0.5× and 1× have a better resolution than the scanned images, but the difference is not that important and the photographic procedure requires more work time. Thus, all thin sections were scanned, but not all of them were documented at magnifications of 0.5× and 1×. Not all unprepared samples documented under the stereomicroscope were photographed at magnifications 0.5× and 1×.

The samples of chert and limestone were characterized according to the microfacies criteria: primary constituents, such as the amounts and types of grains, matrix, and cement; mineralogy; depositional fabrics and associated environments; diagenetic fabrics. The mudstones and sandstones were characterized according to the systematic petrography of siliciclastic rocks. The amounts of primary constituents were estimated against visual comparison charts using the 0.5× and 1× photographs and directly under the microscopes. Between the two research perimeters, only the relevant hand specimens were compared directly, while the microscopic comparison was conducted via the photomicrographs.

[1] The thin sections were preparade at the Geology Department of the Faculty of Biology and Geology, Babeș-Bolyai University in Cluj-Napoca.