

The Vienna Glagolitic Projects: Past and Present

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The article shortly describes the pre-history and history, character and some results of three subsequent Austrian Science Fund projects engaged in the interdisciplinary analysis and edition of the Glagolitic manuscripts discovered in the great find of 1975 at St. Catherine's Monastery in the Sinai. While the first of them was still dedicated to single manuscripts, the following gradually widened their focus into a complex analysis of all Glagolitic manuscripts preserved in the Sinai and beyond. Likewise, in the current third project the scope of analysis has been extended from the core-disciplines philology, computer vision and materials chemistry also to microbiology (DNA) and conservation-restoration, providing additional insight in the origin and further fate of the manuscripts.

Key words: Glagolitic-Old Church Slavonic manuscripts, Sinai, interdisciplinary investigation

1

One of Rajko Nahtigal's greatest contributions into Slavistics doubtlessly represents his two-volume edition of the Sinaitic Euchologium (Nahtigal 1945–46).² So he would have surely been very interested in the remarkable manuscript-find of 1975 at St. Catherine's monastery, which yielded, besides many others, seven Glagolitic-Old Church Slavonic manuscripts including another part of the Euchologium! Six of these manuscripts were described and partly reproduced in Ioannis Tarnanidis' catalogue of the new Slavonic finds (Tarnanidis 1988), while one fragment was first mistaken for Ethiopian and only in 2011 identified as Glagolitic by the librarian of the monastery, father Justin.³

1 Apart from the authors responsible for the article, the following colleagues, to whom we express our sincere thanks, have so far participated at various times in the projects described here: in Vienna Velizar Sadovski; Markus Diem, Angelika Garz, Melanie Gau, Ernst-Georg Hammerschmid, Florian Kleber, Martin Lettner, Michael Melcher, Maria C. Vill; Ana Čamba, Fabian Hollaus, Dana Hümer, Wilfried Vetter, Florian Wandl; Katsiaryna Ackermann, Patricia Engel, Bernadette Frühmann; and abroad Ioannis Tarnanidis (Thessalonica), Maria Schnitter (Plovdiv), Elena Velkovska and Stefano Parenti (Rome), Catherine M. MacRobert (Oxford), Andrej N. Sobolev (St. Petersburg/Marburg), Viktor A. Baranov (Izhevsk), Tat'jana I. Afanas'eva (St. Petersburg), Nina Glibetić (Notre Dame) and Yavor Miltenov (Sofia).

2 See the articles of I. Karačorova, R. Kojčeva and L. Taseva in this volume.

3 Parts of previously known codices: *Euchologii Sinaitici pars nova* (Sin. slav. 1N), *Psalterii Sinaitici pars nova* (Sin. slav. 2N); entirely new manuscripts: *Psalterium Demetrii* (Sin. slav. 3N), *Medical Folia* (inserted in 3N), *Tropologium* ('Small *Menaem*') *Sinaiticum* (Sin. slav. 4N), "*Missale*" *Sinaiticum* (Sin. slav. 5N) and a single folio with part of the midnight liturgy, possibly belonging to a *Horologion* (Glibetić 2017).

Since Tarnanidis' work a good many palaeoslavists have been engaged in the analysis and edition of the Glagolitic finds, among them also Petra Fetková-Stankovska and C. M. MacRobert, who are contributing to this volume. We can divide the investigation-history into two parts: the early years of mere philological investigation, dedicated to single manuscripts and based almost exclusively on Tarnanidis' catalogue, and the interdisciplinary period, which has gradually widened its focus into a complex analysis of all Glagolitic manuscripts preserved in the Sinai, partly also beyond, and been based also on autoptic work with the originals and new image-material. In this article we will concentrate on the second period which led to three Austrian Science Fund projects centered in Vienna.⁴ Let us first briefly recall their history:⁵

2

The impetus of interdisciplinarity arose from the difficulties in deciphering the so-called Sinaitic Missal 5N,⁶ combined with the brand new introduction of multispectral photography into manuscript research. It was the time when the Archimedes Palimpsest Project was started in the USA (1999–2008),⁷ and two years before Dieter Harlfinger was to launch the European palimpsest project "Rinascimento virtuale" with the technical aid of the Italian company Fotoscientifica (2001–2004).⁸

Encouraged by such endeavours, H. Miklas got in touch with the head of the Codicological laboratory of the Russian National Library in St. Petersburg, Denis O. Cypkin, who had been the first to apply multispectral photography on Slavonic manuscripts.⁹ Equipped with a television (CCD) camera, a set of optical filters and the software Adobe Photoshop®, they started analysing the palimpsest-part of the Zographou-Gospel (Cod. RNL Glag. 1) and could observe such interesting details as its double ruling.¹⁰ Convinced of the great possibilities of such techniques, they worked out a concept for the establishment of a technical laboratory for the

4 "The Glagolitic Sinaitic Sacramentary (Euchologium) Manuscripts" (no. P19608 – 2007–2010; cf. <https://cvi.tuwien.ac.at/project/the-sinaitic-glagolitic-sacramentary-euchologium-fragments/>), "The Enigma of the Sinaitic Glagolitic Tradition" (no. P23133 – 2010–2014, cf. <https://cvi.tuwien.ac.at/project/the-enigma-of-the-sinaitic-glagolitic-tradition-2/>), and "The Origin of the Glagolitic Manuscripts" (no. P29892 – since 2013; cf. <https://cvi.tuwien.ac.at/project/the-origin-of-the-glagolitic-old-church-slavonic-manuscripts/>).

5 Cf. also Miklas 2008.

6 See Miklas 2000. According to our present knowledge this liturgical collection once consisted not only of the 'Missal' (or rather: Sacramentary), but also of the so-called Petersburg Služebnik (the fragments of Krylov and Uspenskij BRAN 24.4.8 & RNL, Glag. 2) as its first part; therefore, the whole collection is better to be named 'Liturgiarium Sinaiticum'. In the following, I shall stick to the name given by I. Tarnanidis, when ms. 5N is concerned only.

7 <http://www.archimedespalimpsest.org/>.

8 <http://www.rinascimentovirtuale.eu/>.

9 Continuing the significant attempts of D. P. Ėrastov, cf. Miklas & Rapp 2015:4, 11.

10 See Miklas & Rapp 2015, fig. 3.

analysis of written heritage. Since Miklas had taken up the work at the Missal (Liturgiarium) in the Balkan Commission of the Austrian Academy of Sciences, they proposed it to the vice-president of the Academy, who immediately promised to support it. Yet, the secretary general saw himself unable to sacrifice the million Austrian shillings they had estimated and advised Miklas to found an association instead. Thus, after another year of preparation, the Vienna Archaeographic Forum (WAF) was established in 2002.

As we noted on its homepage,¹¹ the major goal of our association lies “in the initiation and implementation of interdisciplinary research projects, which shall be followed in due course by appropriate training courses”. This dictum we followed right from the beginning, even if it took a while to succeed. Because our first, large-scale project, which we proposed to the Austrian Science Fund in 2004,¹² was surely planned excellently, but nevertheless failed because of one of the reviews. So we divided it into several single projects, which were launched in the following years, among them the first two Glagolitica projects that went under way in 2007 and 2010, respectively.

Their successful run enabled us to receive a starting grant from the Austrian Federal Ministry of Science and Research and in 2014 to found the Centre of Image and Material Analysis in Cultural Heritage, short CIMA.¹³ Currently, CIMA forms the basis of our third Glagolitica project, which started in March 2017.

3

Structure and aims: All the mentioned projects including CIMA bring together the expertise of three disciplines from three universities: philology from the University of Vienna, computer science from the Computer Vision Lab (CVL) of the TU Wien and materials chemistry from the Institute of Science and Technology in Art (ISTA) at the Vienna Academy of Fine Arts Vienna. For certain specific tasks we are co-operating with colleagues from other Austrian and foreign institutions. Thus, since the beginning our internet editions have been handled by our Izhevsk colleagues under the lead of Victor A. Baranov;¹⁴ and in our new project microbiologists from the Department Biotechnology at the University of Natural Resources and Life Sciences in Vienna (BOKU) and a conservation-restoration expert from the Danube University of Continuing Education, Krems/Austria take part in order to widen our possibilities.¹⁵

11 <https://waf.cvl.tuwien.ac.at/>.

12 Shortly described in Miklas 2004, cf. http://conf.evarussia.ru/eva2004/eng/reports/report_211.html.

13 <http://www.cima.or.at> and <https://hrsm.cvl.tuwien.ac.at/>.

14 On the platform *Manuskript*, see http://mns.udsu.ru/mns/portal.main?p1=55&p_lid=2&p_sid=1.

15 See the details on <https://hrsm.cvl.tuwien.ac.at/team/>.

While the philologists have been mainly engaged in the codicology, palaeography, textology and the editing of the sources, our technical research is in the fields of imaging, image processing and -analysis as well as in the non-invasive analysis of the materials used for the production of the manuscripts.

When you tackle such a venture, you have to have a vision and you must develop a certain working philosophy. Our vision was outlined on the 2004 EVA-conference (Miklas 2004) as a scenario in which the investigation of written heritage will be

- done almost exclusively based on images;
- enabled or improved by special recording-methods;
- more exhaustive, precise, better objectivizeable and less time consuming via automated image analysis; and
- executed with a set of tools which can be applied also by humanity-scholars after a learning-process.

Even if our tools have meanwhile grown considerably, our philosophy has not changed; thus, we are still following four principles:

- (1) harmlessness: The analyses must not harm the objects, neither in the process nor after the investigation;
- (2) mobility: Since the sources are usually preserved in places from where they cannot or must not be removed, the technical instruments we use or develop must be easily transferable;
- (3) rapidity and economy: The application of our instruments must be as quick – and therefore cheap – as possible, without lessening the quality of the analyses. Usually this implies a maximum simplicity of the construction;
- (4) robustness and reliability: This can best be illustrated by the sentence “What we need is a Jeep which works under any condition, not a Ferrari which can only be used under ideal conditions.”

Now let us turn to practice.

3.1

Philology:¹⁶ The philologists propose the objects of investigation, supervise the work, discuss solutions for the technical tasks with the scientists and execute the philological analysis of the sources. We will return to some results at the end.

16 Cf. our previous report on CIMA in Miklas & Rapp 2015.

3.2

*Computer Vision:*¹⁷ Here we are focusing on three major areas – Imaging and Image Processing and Automated Document Analysis. Most important for the examination of the Glagolitic sources, which are partly preserved in a bad condition and predominantly contain palimpsests, has been the digital restoration and readability enhancement via multispectral imaging (MSI) and post-processing. MSI means taking images in various narrow spectral bands which can then be combined in various constellations and further developed.¹⁸ For this purpose a mobile acquisition-system has been established, which can be surrounded by a black tent. Figure 1 shows the system and the range we are using presently – 11 bands reaching from Ultra Violet to Near Infrared (365 to 940 nanometers). For the 365nm illumination, a fluorescence image is acquired additionally to the reflectography image. For specific objects, for instance written with carbon ink or darkened by various influences, we use a special infrared camera called “Osiris” (by Opus Instruments¹⁹). Contrary to our American EMEL colleagues (<http://emel-library.org/>) who are working with a higher amount of photographs, but only one camera, we usually use two, an achromatic for MSI²⁰ and a normal R(ed)G(reen)B(lue) camera to produce also true color pictures and color-separated UV fluorescence images. This is important for three reasons, one of them being that the scholars engaged with them get a “natural” impression of the object; another concerns the production of true color print editions, while the third is to bridge minor gaps within the chosen MSI-range by the wide and uninterrupted range of the RGB-camera under broad-band illumination.

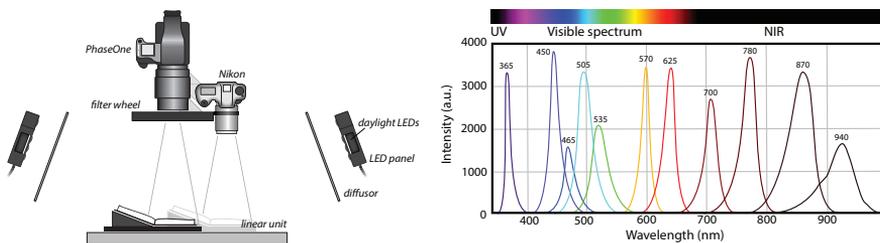


Fig. 1: MSI-setup and wavebands used presently. The image on the right has been created by Bill Christens-Barry (Equipoise Imaging) and has been modified by the authors of the actual work.

¹⁷ Cf. already Sablatnig, Hollaus, Čamba 2015 with further details.

¹⁸ See, e.g., Hollaus, Gau et al. 2015 and Miklas, Brenner, Sablatnig 2017.

¹⁹ <https://www.opusinstruments.com/products/osiris-camera/>.

²⁰ Presently a PhaseOne IQ260 achromatic camera with a resolution of 8984 x 6732 pixels.

The processing-part can best be outlined in illustrations: First, the images have to be aligned to each other or “registered” (Figure 2).



Fig. 2: Coarse Registration – Scale-Invariant Feature Transform (SIFT) based approach (left). Fine Registration – Modality Independent Neighbourhood Descriptor (MIND) approach from medical image processing (right).

Then dimensionality reduction techniques separate different text-layers or segment parts of interest. Finally, mere visual methods can be applied such as pseudo-coloring, in order to further enhance the readability (Figure 3).

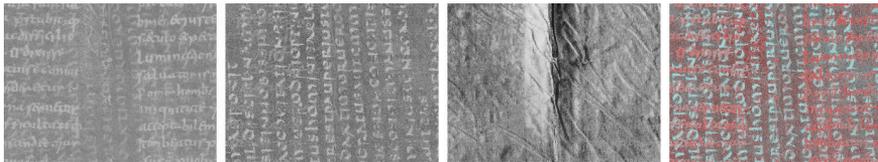


Fig. 3: Layer-separation of a palimpsest (from left to right: overtext, undertext, support) and pseudo-color image.

In the case of the Missal the improvement of techniques led to three stages of readability that caused us to decipher its text three times!²¹

Especially in the first project our computer scientists, urged by the philologists, invested much energy in the development of graphemic tools which were combined in a Tool Box for Manuscript Research (Gau, Vill et al. 2010, Figure 4). Now they are concentrating on subjects such as scribe identification and OCR software.²²

21 Cf. Miklas & Rapp 2015, Fig. 2, showing the first and the last stage and the results of the decipherments.

22 See, e.g., Diem, Fiel et al. 2014, Hollaus, Diem, Sablatnig 2014 and Sablatnig, Hollaus, Čamba 2015.

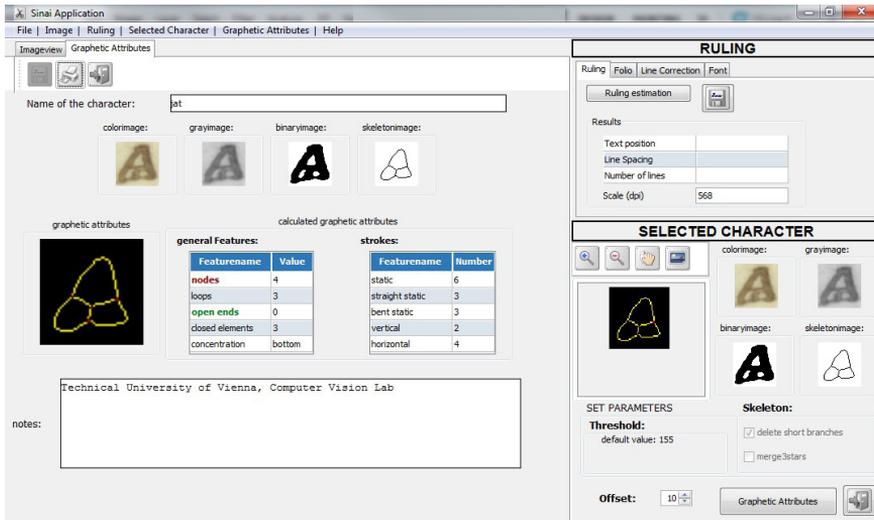


Fig. 4: Tool Box for Manuscript Research – Graphetic character-calculation and Ruling analysis.

3.3

*Material Analysis:*²³ The material analysis concerns the support (so far usually parchment), the inks, pigments, dyes and the binding media used for the manuscript production. After starting with a self-built XRF instrument,²⁴ CIMA now applies, depending on the object and the situation, two to four complementary spectroscopic methods in order to analyze the chemical elements and compounds: the compulsory X-ray fluorescence analysis (XRF), Fourier Transform InfraRed analysis in the reflection mode (rFTIR), and, in addition, either Raman or UV-vis spectroscopy.²⁵ Figure 5 shows the old and the new XRF apparatus, Figure 6 the Raman and rFTIR spectrometers presently used.

²³ Cf. already Schreiner, Vetter, Frühmann, Cappa 2015 with further details.

²⁴ See Schreiner, Vetter et al. 2015, Fig. 1-3.

²⁵ See Frühmann, Cappa et al. 2018.

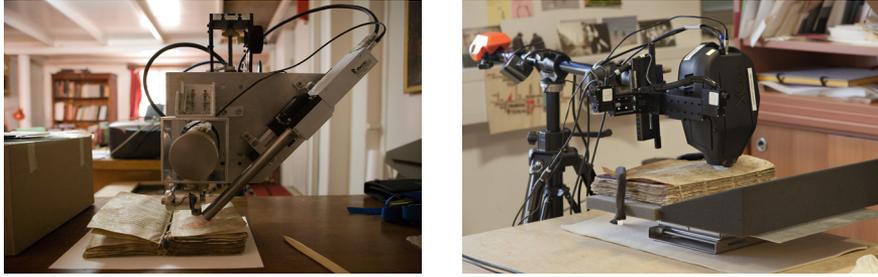


Fig. 5: The self-built XRF spectrometer with the Sinai Psalter in St. Catherine's Monastery (left) and the instrument ELIO (XGLab, Milano, Italy) measuring the Cod. Suprasliensis in the restoration department of the Slovenian State and University Library, Ljubljana (right).



Fig. 6: The rFTIR-system Alpha (Bruker Optics, Ettlingen, Germany) (left) and the Raman spectrometer (Enwave Optronics, USA) at the Austrian National Library, Vienna (right).

These analyses serve three coherent aims: first they lead (paradigmatically) to the chemical identification of the materials (e. g. elemental composition) (Figure 7); secondly, the comparison of the data help (syntagmatically) to determine relationships between objects and contribute to their dating and localization; and thirdly, the results yield a better understanding of certain degradation or alteration phenomena we observe on the objects; thus, for instance, the enigma of the “white” ink in the Sinaitic Missal 5N (Figure 8).²⁶

²⁶ Cf. also the clear example in Miklas & Rapp 2015, Fig. 4.

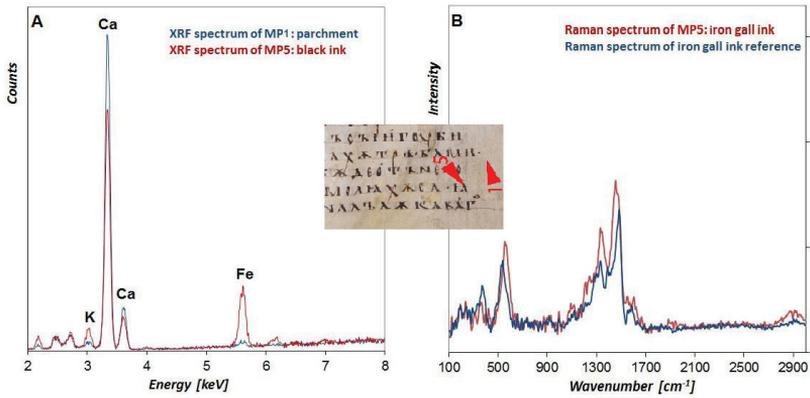


Fig. 7: XRF- and Raman from the parchment and the brown/black ink of a folio in the Cod. Suprasliensis (Ljubljana-part) indicating the presence of iron gall ink applied in the text.



Fig. 8: “White ink” in the Sinaitic Missal 5N.

Thus, some 90 important objects from various traditions (beyond Glagolitic and Cyrillic Old Slavonic also Greek, Latin, Gothic, Old High German, Armenian, Georgian, Nubian, Aramaic, Hebrew, and Ottoman sources) have already been partly or fully imaged, of which about 60 have also been examined by material analysis.

Recently, our microbiologists have started analyzing the DNA (metagenome) of the parchment, which includes the DNA of the animal skin, but also living organisms thriving on the parchment, as bacteria, fungi and viruses. In the case of the Missal they have been able to confirm that the skin is coming from sheep. In it they detected a virus infecting a plant called “Taro” (*Colocasia esculenta*); which was probably first native to Malaysia, then cultivated in tropical India and from there shipped to ancient Egypt. Its high anthocyanine concentration made it possible to be used for inks. This raises the question whether some of the Missal’s inks was composed of anthocyanines gained from Taro, as it was a common plant in Egypt?²⁷ These and other interesting results show completely new possibilities of tracing the provenance and fate of a manuscript!

Therefore, we are presently trying to include analyses of stable isotopes of the parchment collagene, too.²⁸ Naturally, the DNA analyses have been done systematically yet, because (except for the new rubbing method applied for DNA-sampling²⁹) sampling of such precious objects is not allowed only micro samples which are either completely loose or on the verge of breaking off from the folios can be collected.

4

In the end let us return to the Glagolitic manuscripts and add some general results of our investigations: While the first historical hint to the presence of Slavs in the Orient comes from Cosmas’ *Treatise against the Bogomils*,³⁰ the manuscripts of St. Catherine’s library indicate that Slavic pilgrimage to the Christian East must have started about one or two generations earlier in the first half of the 10th century. Presently, we count 81 Slavic manuscripts (at least 84 units) there, 41 (43 units) of which were discovered in 1975; but there are many more scattered over different libraries, such as the Russian National Library in St. Petersburg, the Vatican Apostolic Library, the French National Library in Paris and the Ukrainian National

27 Cf. Grimaldi, Muthukumar, Tozzi et al. 2018.

28 Such an approach has recently been introduced by our Moscow colleagues under the guide of Elena Ukhanova (State Historical Museum), see Ukhanova & Bogomolov (forthcoming).

29 I.e. the York method, applied successfully for genome analyses, cf. Teasdale, Fiddym, Vnouček et al. 2017.

30 “... But others who do not go and get shorn according to the law leave for Jerusalem, others again for Rome and other cities, and (thus) exhausting themselves return home (and) deplore the terrible effort ...”, cf. the Old Church Slavonic text in Begunov (1973:351).

Library in Kiev. If we include two well known *membra disiecta* – the Kiev Folia and the Codex Assemanianus – as well as the Sinaitic Glagolitic palimpsests preserved in the Cyrillic Cod. 39 of the old collection³¹ and the so-called Petersburg Oktoich in the fascinating Sinai Miscellany (relevant part: RNL Q.p.I.64³²), 11 of them are written in Glagolitic, the rest in the Cyrillic script. The bordering line between them runs almost exactly along the turn of the 11th/12th centuries.

With the aid of a new, graphemic dating and localization method³³ we can group these Glagolitic manuscripts (here I skip all unidentified or/and undeciphered palimpsests) and their scribes as follows:

- (1) First comes the Kiev Sacramentary, written by two scribes from the area of the former Moravo-Pannonian Empire (then by all likelihood Hungary) around 925-935³⁴ and supplemented by Demetrius approximately in the last decade of the 11th century (cf. sub 4); then follow
- (2) the Aprakos Gospel of Assemani, written by two scribes from Western Bulgaria, the main scribe belonging approximately to the years 986-1006, the complementary scribe to the third quarter of the 11th century;³⁵
- (3) the two liturgical collections Euchologium and Liturgiarium Sinaiticum, written by the probably East Bulgarian scribe in the 1020ies and 1030ies, respectively, the latter with two additions from the third quarter of the 11th century and the end of the 11th century by scribes from the Western Balkans, one of them to be identified with Demetrius;³⁶
- (4) the newly identified folio, recently edited by Nina Glibetić as probable part of a horologion (Glibetić 2017), from the beginning of the 11th century, and a tropologion- or menaion-fragment from the 1080ies (Miklas, Hürner, Gau 2012), both composed by single scribes³⁷ most likely from Duklja (today's Montenegro). Also of the same origin seems to have been Demetrius, whose additions to the Kiev Folia, the Liturgiarium and the Psalter 3N are mentioned sub 1, 3 and 6;
- (5) the Medical Folia, a small fragment with medical prescriptions from the middle of the 11th c., obviously written by a scribe from Istria (Miklas et al. 2012);
- (6) the Psalterium Sinaiticum, written by 11 hands in the second decade of the 11th century,³⁸ and the Psalter of Demetrius 3N, written by four scribes in the

31 See Altbauer & Mareš 1981, Schaeken & Birnbaum (1999:104).

32 See SK XIII, 276–277 (no. 305) and Schaeken & Birnbaum (1999:125).

33 Cf. Miklas & Hürner 2015a and Miklas 2017.

34 Cf. Hürner 2010 with literature.

35 Cf. only Schaeken & Birnbaum (1999:98–100).

36 Scribes B (Demetrius) and C, cf. Miklas (2000:123–125).

37 A correction by another hand on the verso-side of the Horologion fragment is too short to be estimated properly.

38 Cf. also Fetková 2000 with literature.

third quarter of the 11th century³⁹ (for its later entries cf. sub 4⁴⁰), most of them originating from different parts of Dalmatia,
(7) and finally the Aprakos Gospel palimpsest of Cod. Sin. 39 and the Petersburg Oktoechos palimpsest, written probably by one hand each in the second half and the end of the 11th century,⁴¹ respectively.

In an attempt to reconstruct the Glagolitic manuscript production of St. Catherine's, we have divided these manuscripts into three categories: (a) those which were definitely written in the Sinai,⁴² (b) those which were very likely written there,⁴³ and (c) others for which a Sinaitic provenance cannot yet be proven for a too limited amount of criteria or seems rather unlikely. General 'Sinaitic' criteria are (beyond the place, where they were discovered):⁴⁴

- one or more palimpsest-layers and/or other traces of material shortage,
- liturgical content,
- Western influences (especially in the content, but also in palaeography etc., cf. Miklas & Hürner 2015),
- similar small measures,
- a comparatively modest outfit,
- and, especially in larger codices, the combination of different scribes and orthographies.

More specific criteria can derive from the codicology, content, secondary entries, etc.

Taken together, out of the 11 Glagolitic manuscripts nine to ten⁴⁵ are likely to have been written in the Sinai, containing parts of some 22 different scribes, plus about 10 hands who corrected or added secondary entries. So we have to do with approximately 32 Slavs who lived and worked in St. Catherine's or nearby, and one or two more to whom we may attribute a donation of a manuscript. While most of these scribes have remained anonymous, an exception represents Demetrius, who

39 See the facsimile edition in Miklas et al. 2012; a critical edition is to appear soon.

40 Furthermore, we observe a Latin minuscule-abcendarium by another, Western hand on fol. 2r.

41 According to earlier estimations (cf. the literature in fn. 30). The fragmentary material of the two texts is insufficient for a proper dating and localization by the given method.

42 This applies at least to the Liturgiarij, the two Psalters, the Horologion fragment and the Oktoechos-palimpsests as well as the later additions of Demetrius.

43 To this group belong the Kiev Folia, the Medical Folia, the Sinaitic Gospel-palimpsest and probably also the Menaion fragment.

44 Cf. already Miklas (2011:40–45).

45 All but the Sinaitic Euchology and the Assemani-Gospel, whose traits are to be further studied. So far, its ('Syriac') textology, remarkable artistic make-up, no less characteristic appearance of the rare 'Sunny Cher' (presently studied by Inna Dimitrova, Sofia, in her doctoral thesis), which unites it with the Sinaitic Psalter and Demetrius' Glagolitic abcendarium in the Medical Folia, and newly discovered palimpsest-traces seem to be the only tokens of a possible Oriental origin. What speak against it, are its splendid calligraphy and making; but, on the other hand, even in present state the Liturgiarij looks very handsomely, too!

deposited his name and a most remarkable prayer-cycle with a threepartite Latin-Greek-Glagolitic abecedarium in the Psalter named after him and added texts and notes in two more, the Kiev Folia and both parts of the Liturgiarius (cf. Hüner 2010, Miklas 2014). From his (Cyrillic) commemoration list in its Petersburg fragment it can be concluded that he belonged to a group of adherents of Saint Romuald of Ravenna, the founder of the Camaldolese, who had spent several years on Istria and founded or renewed the monastery of Michael the Archangel and others there.⁴⁶

As indicated above, at least seven of the Glagolitic sources contain or happen to be palimpsests; apart from the so-called Sinaitic Palimpsest and Petersburg Oktoechos, remnants of underlayers have been discovered in the Sinaitic Psalter and Missal, the Medical Folia, while in Demetrius' Psalter and in the Codex Assemanianus (Figure 9) only weak traces point to a former use.

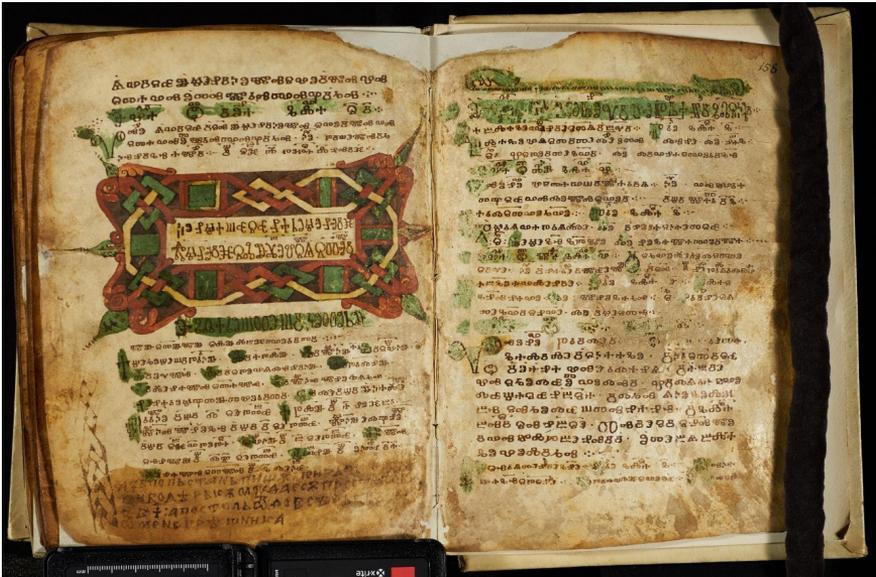


Fig. 9: Probable palimpsest-folios in the Codex Assemanianus (Vat. slav. 3).

While in four recognizable cases we have to do with one or two (Glagolitic) underlayers, in the case of the Medical Folia we observe altogether three – a Latin, a Cyrillic (or Greek) and a Glagolitic! It does seem significant that one of them (so far tentatively identified with the Latin layer) also contains two miniatures, probably showing St. Michael the Archangel and the Theotokos eleousa.⁴⁷

46 For the whole, vast complex see Miklas, Gau, Hüner (2016:43-68).

47 Cf. Miklas 2018 (forthcoming).

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Povzetek: Dunajski glagolski projekti: preteklost in sedanost

V članku so prikazani trije zaporedni interdisciplinarni projekti, ki jih je finančno podprl Avstrijski znanstveni sklad (FWF). Ukvarjajo se z najdbami starocerkvenoslovanskih glagolskih rokopisov na Sinaju leta 1975 in njihovim pomenom za celotno glagolsko tradicijo (Rokopisi glagolskega sinajskega sakramentarja /Euchologium/, 2007–2010, Enigma sinajske glagolske tradicije, 2010–2014 in Poreklo glagolskih rokopisov, od leta 2017 naprej). Delo se je začelo kot sodelovanje treh skupin: filologov z Inštituta za slavistiko Dunajske

univerze, računalniških strokovnjakov iz Computer Vision Lab na TU Wien in kemikov-fizikov z Inštituta za znanost in tehnologijo Akademije za likovno umetnost na Dunaju. Da bi se razširile možnosti znanstvenega raziskovanja, so se trenutnemu projektu pridružili člani naslednjih dveh inštitutov: mikrobiologi z Oddelka za biotehnologijo Univerze za naravne vire in znanosti o življenju na Dunaju (BOKU) ter strokovnjak za konzerviranje in restavriranje z Univerze za nadaljnje izobraževanje v Kremsu (Avstrija).

Medtem ko je glavni cilj filološko raziskovanje in izdajanje novih glagolskih rokopisov ter študij njihovega zgodovinskega in kulturnega konteksta, so bili znanstveniki naravoslovci vključeni z namenom zagotavljanja ohranitve rokopisov in besedil (vključno s palimpsesti) v slikah na eni strani ter razvoja tehnik in orodij za snemanje, konzerviranje ter restavriranje in analizo pisnih virov, s katerimi naj bi dopolnili in podprli filološke študije, na drugi strani. Tako je metodologija znanstvene obravnave razdeljena na naslednje naloge:

1. Pridobivanje slike: Ker se rezultati uporabe fotografske tehnike v navadni svetlobi izkazujejo pri danih rokopisih za nezadostne, se uporablja multispektralno slikanje, ki je postalo močno orodje pri znanstveni analizi in dokumentaciji starih rokopisov z »latentnimi« besedili (npr. palimpsesti).

2. Analiza slike: Po snemanju je treba digitalne slike registrirati in analizirati. Pripravljalni koraki obdelave, ki povečujejo berljivost besedila in pripravijo slike za transkripcijo, interpretacijo in restavriranje, so glavni del tehnične analize slike.

3. Analiza materiala: Za dokončanje celovitega opisa rokopisov, pomoč pri ustrezni dataciji in lokalizaciji je treba analizirati material rokopisov. Od začetka je to nalogo opravljala elementarna analiza ISTA z uporabo rentgenske fluorescencence (XRF), skupaj s specifičnimi metodami za analizo spojin, kot so infrardeča spektroskopija s Fourierovo transformacijo (rFTIR), Ramanska spektroskopija in UV-VIS spektrometrija pergamenta, črnih pigmentov, barvil itd.

Strokovnjaki za konzerviranje in restavriranje zdaj dopolnjujejo raziskave in jih poglobljajo z mikrobiološko analizo DNK in z analizo specifičnih lastnosti pergamentne strukture (npr. iz izginulega besedila), veznega materiala itd. Vzajemno delovanje različnih raziskav omogoča, da pridemo do novih odkritij, in prispeva k razvoju novih metod, ki so lahko koristne za raziskovanje kakršnihkoli predmetov pisne dediščine.

Ključne besede: glagolski starocerkvenoslovanski rokopisi, Sinaj, interdisciplinarne raziskave