Interreg France - Suisse

MetalPAT

Newsletter 4 – November 2021

The MetalPAT project brings together a large group of professionals spread over the Interreg France-Switzerland region. The numerous collaborations set up between the project partners and the end-users involved contribute to the success of the project through the exchange of knowledge and experience.

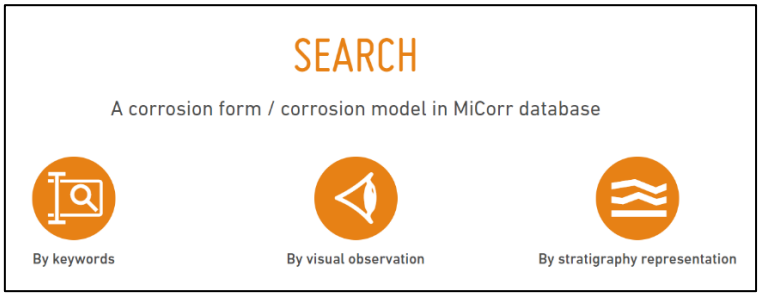
The project partners

As in 2020, the MetalPAT project was again impacted in 2021 by Covid-19. While the application and its search engines continued to evolve, the collaborations with some end-users were severely disrupted.

- **COLLABORATION BETWEEN METALPAT'S PARTNERS**

The tool for identifying heritage metals based on their macroscopic description, which was requested by end-users – collections managers - and developed in 2020 with the support of the *Communauté du Savoir* (CdS), was optimised thanks to a second CdS project. The IFOM-Pat project, intended to cover complex identification problems not addressed by the first prototype, made it possible to make it more relevant at the end of four workshops dedicated to the selected problems (modern metals, metals with surface treatments, metals associated to organic materials (composites) and archaeological metals).

A plenary meeting, concluding the project, allowed to report to all the participants on the progress made and to discuss the implementation of the prototype on the MiCorr⁺ application in the form of the search engine "By visual observation". This work was entrusted to Yann Hackel, a bachelor student at the HEG Arc. The first draft of the engine, presented during the meeting, proved to be promising. Its ergonomics and design will be improved in the coming months.

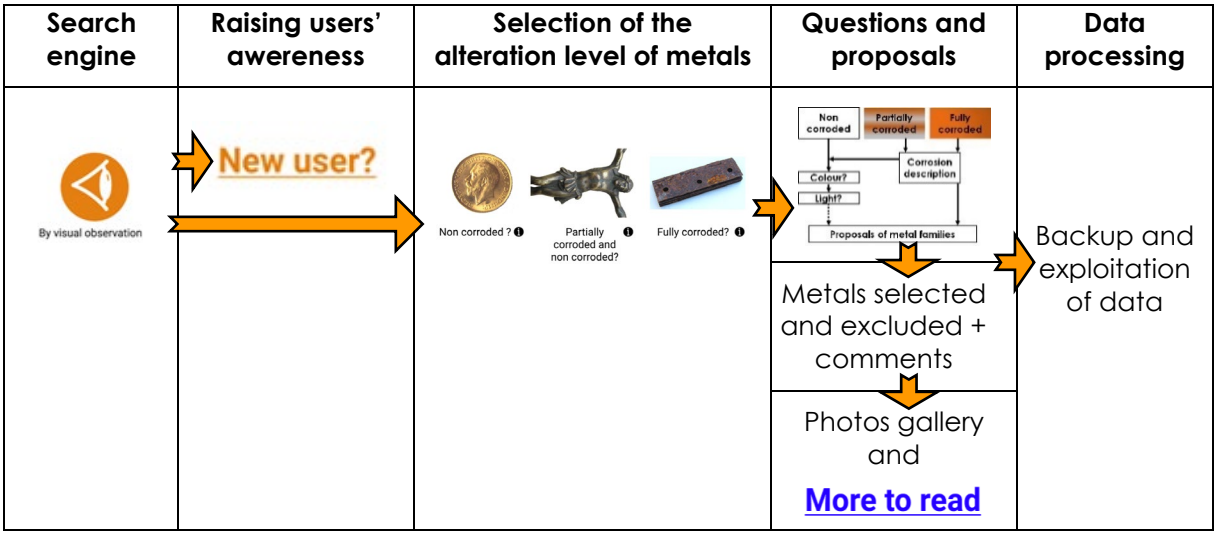


MiCorr⁺'s three search engines , with the new "By visual observation" engine in the centre.

Partenaires : haute école arc neuchâtel berne jura, LMC IrAmat, ARCHEOMATERIAUX LAPA PREVISION ALTERATION

Co-financeurs : Kanton Bern Canton de Berne, JURA CH RÉPUBLIQUE ET CANTON DU JURA, ne.ch RÉPUBLIQUE ET CANTON DE NEUCHÂTEL, CANTON DU VALAIS KANTON WALLIS, canton de vaud

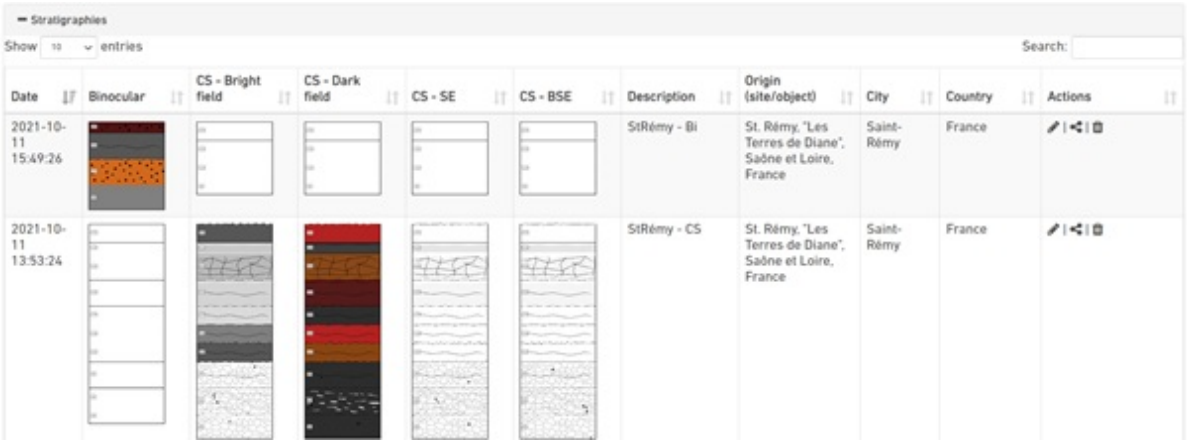
Since collections managers would like the results of the interrogation to be used dynamically within the MiCorr+ application, just like the stratigraphies produced by the "By stratigraphy representation" engine, the HEG Arc is considering various tools that will allow users to save and share their data.



Protocol for the use of the Heritage metal Identification search engine.

The HE-Arc CR, the LMC-Iramat and the LAPA have also made good progress in optimising the search engine by constructing digital stratigraphies of MiCorr+ reflecting the corrosion structures observed on the heritage metals studied. Following the subdivision of the tool into two observation modes (under binocular and on cross-sections), a great deal of work was carried out to optimise the strata fields to be filled in according to the mode selected. The visualization of stratigraphies has also evolved: if a single stratigraphy compiles the observations under binocular, four stratigraphies are to be documented in the observation mode on cross-section (optical microscopy: light and dark field and scanning electron microscopy: secondary and backscattered electrons).

Only one stratigraphy is constructed for a corrosion structure if the same number of strata is observed under binocular and in cross-section. If this number differs according to the mode of observation, two stratigraphies (Bi and CS) are required.



Screenshot of two stratigraphies of the same MiCorr+ database entry.

We are currently testing both modes of observation on case studies, which allows us to validate or not the relevance of certain strata fields to be filled in. Our wish is that each contributor fills in the strata according to his level of expertise, leaving as few empty fields as possible.

These stratigraphies can be found in different places in MiCorr+, thus improving the overall dynamic: under the profile of the contributor who can now share his work with his collaborators, in the associated artefact sheet (stratigraphy under binocular in the "Description and visual information" section, stratigraphy on cross-section in the "Analyses and results" section), and in the "Find similar" function.

This last function is currently the subject of our attention since it should allow users of the search engine, via the comparison of a constructed stratigraphy with those of the MiCorr+ database entries, to help them in their diagnosis. Several answers could be provided: one by default, based on criteria imposed by the application developers, and a second dedicated to the search for the influence of a particular characteristic or sub-characteristic of the strata on the results obtained.

- **COLLABORATION WITH END-USERS**

Due to the pandemic, the IFOM-Pat project's planned workshops with collection managers in spring 2021 had to be postponed to summer 2021. They provided an opportunity for fruitful interdisciplinary exchange between participants from the Interreg region. These end-users contributed in a very proactive way to the optimisation of the prototype developed at HE-Arc, which was also successfully tested with numerous conservation professionals in Switzerland and abroad (workshops at the National Museum of Slovenia, Ljubljana and at the Maritime Museum in Gdansk, Poland).


Practical application of the "By visual observation" search engine prototype by MetalPAT end-users and during a workshop at the National Museum of Slovenia, Ljubljana, credit MNS.

The collaboration with end-users - conservators was not neglected, even if access to the collections was reduced and some missions had to be cancelled or postponed, still because of the pandemic.

Naïma Gutknecht (NGU), conservator and research assistant at the HE-Arc CR and Valentina Valbi (VVA), conservation scientist and post-doc at the LMC-IRAMAT were able to work in parallel or in common on a certain number of objects from the corpus selected in the framework of the MetalPAT project. NGU was in charge of the macroscopic documentation of the materials and more particularly of the description of the corrosion structures under binocular, while VVA concentrated on the observation of these same structures on cross-section and the physico-chemical analysis of the materials.

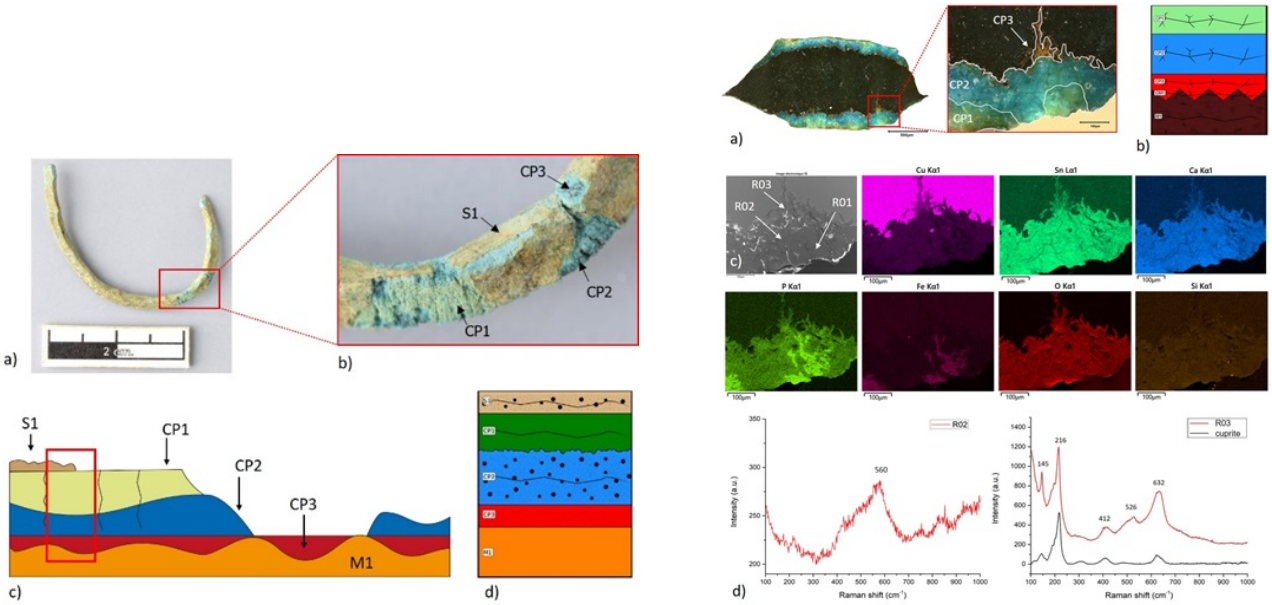
The table below, already presented in Newsletter 3, shows the progress of the work carried out by type of material.

Materials	Research theme	Canton / department	End-user[1] and corpus	2021		2022	
				Semester1	Semester2	Semestre3	Semestre4
Iron	Atmospheric corrosion of cast iron	Territoire de Belfort	UTBM / factory poles				
	Crevice corrosion	Canton de Vaud	SMRA / ring				
		Département du Doubs	MBAA / buckle plate				
	Corrosion of composite objects	Canton du Jura	SAP / knifes				
		Département du Doubs	MBAA / knifes				
	Metallurgic studies	UTBM / LAPA	Inrap				
			MCAH / semi-finished objects				
Copper	Crumbling of corrosion products	Canton de Berne	SACB / pin				
		Canton de Vaud	SMRA / ear pick & fibula				
		Département du Jura	CCE LS / axe				
	Lake corrosion and corrosion in humid environment	Département de Saône-et-Loire	Inrap (Autun) / craft				
		Canton de Neuchâtel	Laténium / pins				
	Metallurgic studies / typical corrosion	Canton de Vaud	MCAH / situla and other containers				
		Etat de Fribourg	SAEF / bracelets				
		Canton de Genève	MAHG / coins				
	Metal soaps	Canton de Genève	MEG / composites				
		Canton de Berne	Foundation HAM / composites				
		Département du Haut-Rhin	MNAM / car parts				
Silver	Horn silver	Canton de Berne	SACB / coin				
	Technological study	Canton du Valais	ABSM / shrine				
Modern metals	Zinc pest	Département du Haut-Rhin	MNAM / car parts				
	Unusual form of corrosion	Canton de Berne	Foundation HAM / military objects				

Technology | Corrosion mechanisms | Conservation | In progress | Planned

The work carried out (stratigraphy, analyses, etc.) is currently being inserted into the artefact files that make up the MiCorr+ database. These are being completely revised in order to better integrate the information obtained from the two modes of observation. Sections are also being created to take into account the analyses carried out non-invasively on the objects studied. Finally, we want to make it more user-friendly for users to fill in the various sections and to make certain functions automatic, so that the work of saving the data collected does not discourage contributors who need to enrich the database.

[1] ABSM : Abbaye de Saint-Maurice ; CCE-LS : Centre de conservation et d'étude des Musées de Lons-le-Saunier ; Fondation HAM : Fondation matériel historique de l'armée suisse à Thun ; Inrap : Institut national de recherches archéologiques préventives ; Laténium : Parc et musée d'archéologie de Neuchâtel ; MAHG : Musée d'art et d'histoire de Genève ; MBAA : Musée des Beaux-Arts et d'archéologie de Besançon ; MCAH : Musée cantonal d'archéologie et d'histoire de Lausanne ; MEG : Musée d'ethnographie de Genève ; MNAM : Musée national de l'automobile de Mulhouse ; SACB : Service d'archéologie du Canton de Berne ; SAEF : Service archéologique de l'Etat de Fribourg ; SAP : Section d'archéologie et paléontologie du Jura ; SMRA : Site et musée romains d'Avenches.



Documentation of a draft of a bracelet from the Service d'archéologie de l'Etat de Fribourg (SAEF): left, information from macroscopic and binocular observation (a) to d)) and right, information from observation and cross-sectional analysis of a sample (a) to d)).

- **COMMUNICATIONS**

Publications

Paper (and presentation) by Valentina Valbi at the Young Professionals Forum 2021 (https://www-centrorestaurovenaria.it/ricerca-e-innovazione/young-professionals-forum/young-professionals-forum-2021): « MiCorr application : a diagnostic tool for corrosion forms on heritage metal artefacts » held on 1-2 July 2021 by video conference.

Talks

- Presentation by C. Degrigny at the Journée d'Etude Recherche et Innovation (JERI2021): « Développement de MiCorr comme outil participatif d'aide au diagnostic des métaux patrimoniaux » held on 4 June 2021 in Toulouse (France). An article is currently being published.

- Presentation by C. Degrigny at the seminar Knowledge and technology transfer of universities of applied sciences: new directions based on proven concepts: « Le transfert de savoir et de technologie comme moyen de maintenir et optimiser des connaissances issues de recherches appliquées à la conservation-restauration des métaux patrimoniaux » held on 3 November 2021. The presentation can be downloaded from https://www.fhnw.ch/plattformen/ktt2021/en/programme/