



The mission of the LIMNOLOGY Center is to provide socially-relevant and multi-disciplinary research to ensure the sustainable use and conservation of natural water resources, both on national and international levels.

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EDITORIAL

Despite the COVID-19 crisis, the year 2020 marks a seminal milestone: after the anchorage of the LÉXPLORE platform and technical installations during the previous year, the project applications for accessing LÉXPLORE have been flowing in and by end of 2020, we are at 25 registered projects.

In May 2020, the external evaluation of the Limnology Center, requested by the EPFL Science Administration, took place – unfortunately on Zoom - by Prof Warwick Vincent (Can) and Dr Karsten Rinke (Ger). The evaluators were impressed by the initiated research activities and by the community-building effort of LIMNC, especially around LÉXPLORE. This led to the third important step, which is the commitment by ENAC to continue supporting LIMNC, including the two staff members Natacha Tofield-Pasche and Sébastien Lavanchy. We would like to take this opportunity to thank the EPFL Research Office, ENAC and Ferring International SA for their continuous supports in the past years.

I would like to extend my sincere thanks to the colleagues from the LÉXPLORE Steering Committee as well as the five LÉXPLORE partner institutions for their time and financial resources, which made this unusual infrastructure possible. My most cordial appreciation is directed to Natacha Tofield-Pasche and Sébastien Lavanchy, who are running the show. Without their commitments during all the different phases, including ups and downs, of the LÉXPLORE development, this exceptional undertaking would not have been possible. My respect!

A J. Wüest, Dir LIMNC



LÉXPLORE platform was intensively used despite the COVID-19

Ensuring a future for the Limnology Center

External evaluation

As Prof. Johny Wüest will retire end of August 2021, the EPFL administration requested an audit for both the LIMNC and the Aquatic Physics Laboratory. The evaluation committee was composed of:



Prof. [Warwick Vincent](#): Laval University, Director of the Aquatic Ecosystems Laboratory



Dr. [Karsten Rinke](#): Helmholtz-Centre for Environmental Research – UFZ, Head of the Department of Lake Research

On 14th and 15th May 2020, we could present and discuss our self-evaluating reports with the auditors on video-conference. The auditors' findings were presented to ENAC Dean and the Head of the Environmental Engineering Institute (IIE) on 19th May.

The evaluation report was extremely positive and highlighted that :

- Both units had excellent research outputs, from fundamental scientific advances to applied solutions and research trainings
- The LIMNC has become a proven hub for research and innovation and provides the backbone for field campaigns, research management, knowledge transfer and high-tech developments
- The LÉXPLORE platform is internationally unique and allows exploitation for research and education in ways that are not possible elsewhere. It is also a powerful vehicle for EPFL-led cooperation between scientific institutions around Lake Léman.

Paving the future within ENAC Faculty

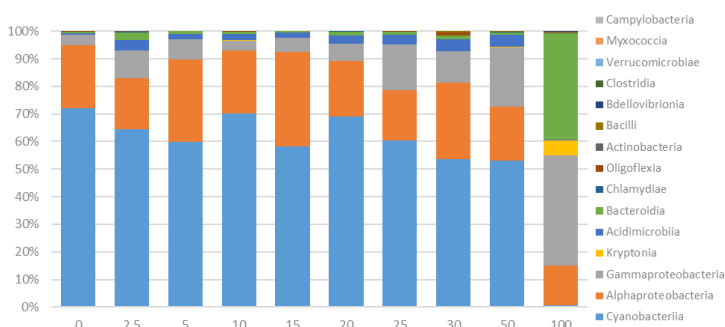
In August 2020, we provided a report benchmarking the LIMNC and the LÉXPLORE platform within the international context. We also proposed long-term perspectives in research, education, and innovations within and beyond EPFL.

In December 2020, the ENAC Faculty confirmed that the Limnology Center can continue and will lead the LÉXPLORE platform until end 2026. Prof. Tom Battin will act as the liaison to the IIE Institute and the ENAC Dean, and support Dr. Tofield-Pasche on strategic matters.

Second Call for EPFL projects

On 3rd November, the Limnology Center organized a second call for LÉXPLORE projects targeted for EPFL researchers. The submitted projects proposed new collaborations with the Swiss Centre for Applied Ecotoxicology (EPFL-Eawag), the Environmental Microbiology Laboratory (ENAC), as well as with the Laboratory of Biological Network Characterization, which opens new opportunities within the School of Life Science. The Center funded the following three projects to a total amount of 78'500 CHF.

Prof. Rizlan Bernier-Latmani Prof. Sebastian Maerkl	GenoRobotics – CoWaS (Continuous Water Sampling)
Dr. Anna Carratalà Ripollès	Unravelling the diversity, functioning and toxin production of cyanobacteria populations in lake Geneva (CYANOFUN)
Dr. Ferrari Benoît	Effects of lake suspended matter quality on growth, emergence and molecular endpoints in <i>Chironomus riparius</i>



CYANOFUN: The goal is to determine how variations in the cyanobacteria populations of Lake Geneva influence the functioning of the ecosystem. The above example shows the main bacteria classes identified by 16s DNA sequencing at different depths on 11th December 2019. The most abundant bacteria class was *Cyanobacteria* from the surface down to 50 m depth, and *Gammaproteobacteria* at 100 m depth.



Effects on *Chironomus*: The ExpoSET system will be used to trap the suspended matter and to expose chironomids in the laboratory. In the future, chironomids will be exposed directly in the field.



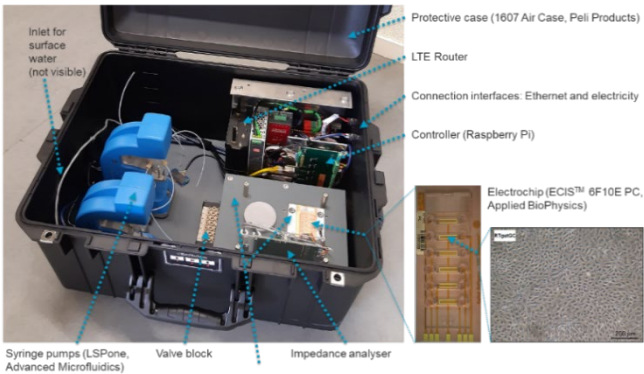
GenoRobotics – CoWaS: aims at developing an automated instrument to continuously monitor the biodiversity in water using DNA analysis. The above Automated DNA Extractor will be tested on LÉXPLORE.

EPFL seed projects on LéXPLORE

Schirmer et al: RAINBOW_{FLOW} CHIP_{ONLINE} - fish cell biosensor for automated water quality testing

The fish cell line from the rainbow trout intestine was successfully grown on a microfluidic chip. The increase in impedance, which reflects cell viability, could be measured, as a result of cells attaching to the electrodes of the chip. Moreover, cells could tolerate a flow-through of minimal medium at a velocity of 2 mL/h. The first prototype of the biosensor allows for automatic preparation and distribution of water samples to the channels of the chip containing the cells, as well as online access to control and view the data.

The next step is to test this setup in the laboratory with pure water, before moving it to the first field application on the LéXPLORE platform in lake Geneva in 2021

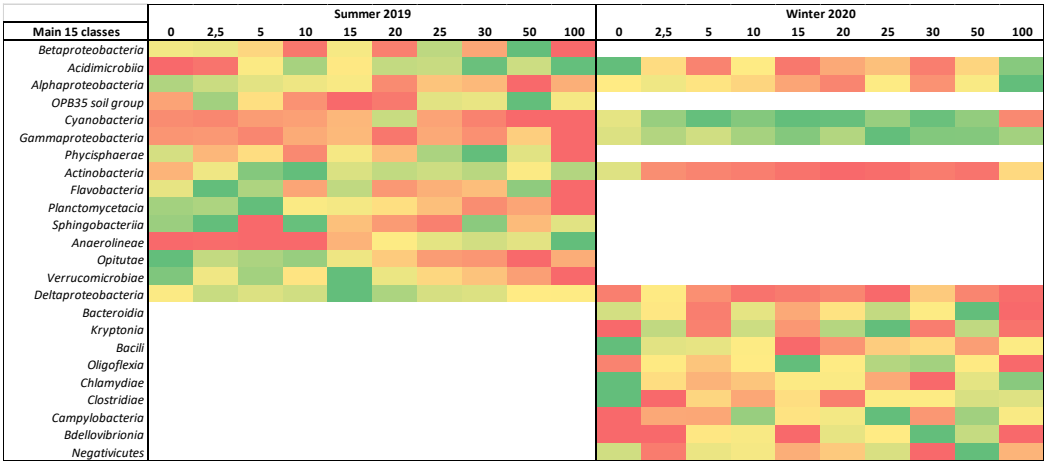


Prototype of the RAINBOW_{FLOW} CHIP_{ONLINE} biosensor

Joost et al: Local Adaptation of freshwater bacteria Communities to environmental conditions (LAC)

In 2019 and 2020, a valuable dataset of more than 200 water samples and their corresponding environmental variables was collected. Interesting distribution patterns could be highlighted, when comparing the main bacteria classes identified in different seasons. In particular, our dataset indicates the existence of seasonal, depth and ecology-related differences in the relative abundance of certain bacterial classes. For example, while Cyanobacteria were very abundant in winter, they were much less numerous in summer. We have also observed an unexpectedly high abundance of *Plankthotrix* genus, which comprise toxic species.

The combined analyses of our community dataset and the environmental measures will allow us to make hypotheses about the main environmental mechanisms influencing the taxonomic patterns observed in our study.



Heatmap showing the relative abundance of the main classes found in the water column in two different seasons

EPFL seed projects on LéXPLORE

Breider et al: MicroSed project - deposition and accumulation of microplastics in lake sediment

The collection of sediment traps placed in Lake Geneva at four different depths have shown that the flux of microplastics varies from 19 ± 12 to 7 ± 4 particles $\text{m}^{-2} \text{d}^{-1}$ at a depth of 12 and 87 m, respectively. The presence of microplastic fragments is predominant with an average occurrence of 72%, followed by 25% for microfibers and 3% for microbeads. Particle size varies between 0.04 and 1.5 mm. We estimate that up to 34 tons of microplastics can accumulate per year at the lake bottom.

In addition, pumping and filtration of lake water have resulted in averaged concentration of 0.3 ± 0.1 particles m^{-3} at a depth of 2 m, and significantly lower at 30 m depth. The stock of microplastics in Lake Geneva is estimated to range between 388 and 694 kg, which are about 3 to 7-fold higher than previous estimation. These results confirm the importance of monitoring the concentration and the flux of microplastics within the water column.

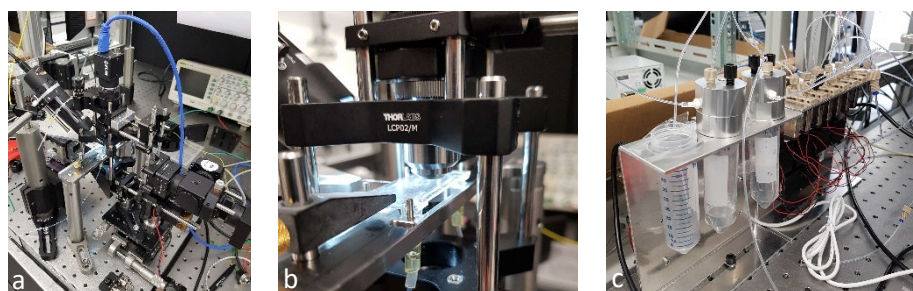


Preparing the sediment traps to collect settling material

Bellouard et al: PhytoWaveTaxa - algae population monitoring

The Galatea team has been readying the setup for deployment on the platform. The system is operational in the lab and collecting data in an automatic fashion, including the filtering and the fluid sampling procedures.

The setup has been scaled and ruggedized for installation in a cubic enclosure. The overall assembly includes the complete fluidic sampling automat, the optical detection, and a miniature computer for acquiring data. The system is currently in the final assembly stage and testing before deployment on the platform. A test in real outdoor conditions is scheduled on the Microcity building rooftop during February 2021.



Images of a) setup mounted on a portable optical platform before mounting in the final casing, b) close-up view of the actual biochip, and c) fluid-handling automat

Science

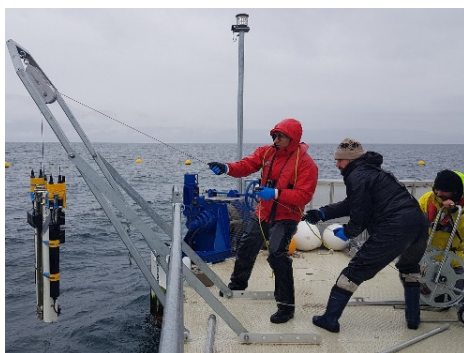
The first scientific publications are expected for 2021 and a few were already submitted end of this year.

In 2020, the following seven new projects were validated:

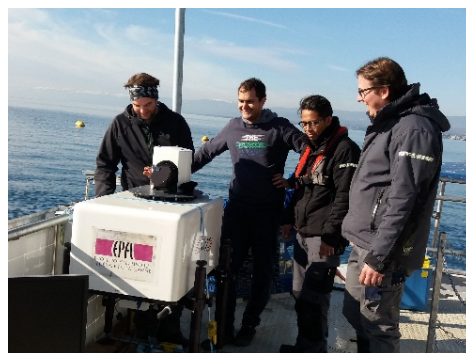
- *EPFL-APHYS/Eawag*, Fernandez Castro Bieito, Gil Coto Miguel, Lavanchy Sébastien, and Bouffard Damien: **LéWalk: autonomous turbulence profiling**
- *EPFL-ECOL/EPFL-WIRE*: Barry Andrew, Foroughan Mehrshad, and Porté-Agel Fernando: **Spatio-temporal analysis of wind field characteristics over Lake Geneva**
- *UNIGE*, Gallorini Andrea and Loizeau Jean-Luc: **MetOxiC : Methylmercury in Oxidic water Column**
- *CARTEL/UNIL*, Jézéquel Didier, Perga Marie-Elodie, Escoffier Nicolas: **DynaMeth - Dynamics and origin of methane in the water column of Lake Geneva.**
- *ETH*, Julie Lattaud : **Variability in stable isotopic composition of long-chain diols as a proxy for environmental conditions in lakes**
- *EPFL-APHYS/UNIL/Eawag*, Bouffard Damien, Fernandez Castro Bieito, Piccolroaz Sebastiano, Perolo Pascal, Perga Marie-Elodie, and Wüest Alfred: **Skin2Bulk: investigating the surface boundary layer**
- *UNIGE/Eawag*, Ibelings Bastiaan, Thomas Mridul, Fillion Roxane, Mesman Jorrit, Devanthery Matthieu, de Loes Sebastien, Müller Beat: **POETICS - PlankOn vErTICAL Structure**

By end 2020, LÉXPLORE reached a total of 25 projects: 10 running, 8 upcoming and 7 completed. We were thrilled to welcome our first project from ETH Zürich.

Due to the COVID-19, we had only a restricted number of campaigns during 24 hours. They took place on: 20-21st February, 14-15th July, and 13-14th October 2020.



Deployment of the Wirewalker for autonomous turbulence profiles



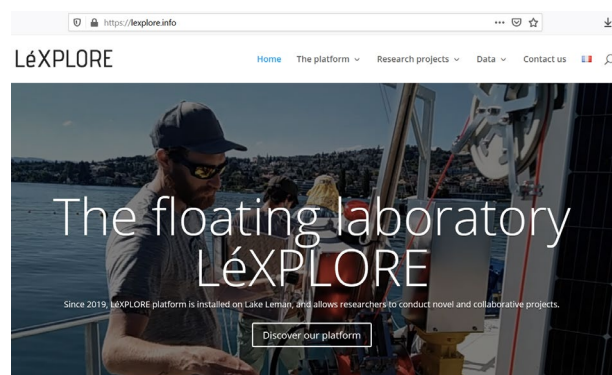
Installation of LiDAR to measure current flows in the atmosphere

Communication and events

Due to the COVID-19 sanitary crisis, the public visits and 4 planned conferences were postponed to 2021. Natacha Pasche built the new website www.lexplore.info in French and in English, which was greatly improved and provide useful information to the researchers. On 7th October, Dr. Pasche presented the LÉXPLORE platform to a public audience for the Société Vaudoise de Sciences Naturelles. On 8th December, the German ZDF came on LÉXPLORE to film fieldwork for a TV broadcast early 2021.



LÉXPLORE presentation in Palais de Rumine



Homepage of the new website

18th Swiss Geoscience Meeting

This annual conference took place online on 6th and 7th November, and was a great success with over 1'100 registrations and 25 parallel symposia. Through the Swiss Society for Hydrology and Limnology, Damien Bouffard, Natacha Tofield-Pasche and Michael Döring organized a dedicated session on [Limnology in Switzerland and the new LÉXPLORE infrastructure](#). In total, 14 talks presented their results, mostly linked to the LÉXPLORE platform. Our session was well attended with up to 35 participants.

The 19 poster pitches were combined with the session on Hydrology and Hydrogeology, with up to 56 participants. We congratulate the authors from the best two posters, that were awarded to:

- Jenny Manner on her novel biosensor that will be tested on LÉXPLORE
- Tomy Doda on lateral transport of dissolved gases in a small lake.

We were pleased with this successful session, where we manage to promote the limnology in Switzerland and to get the LÉXPLORE platform know to a wider community.

PRIMARY PRODUCTIVITY IN SWISS LAKES

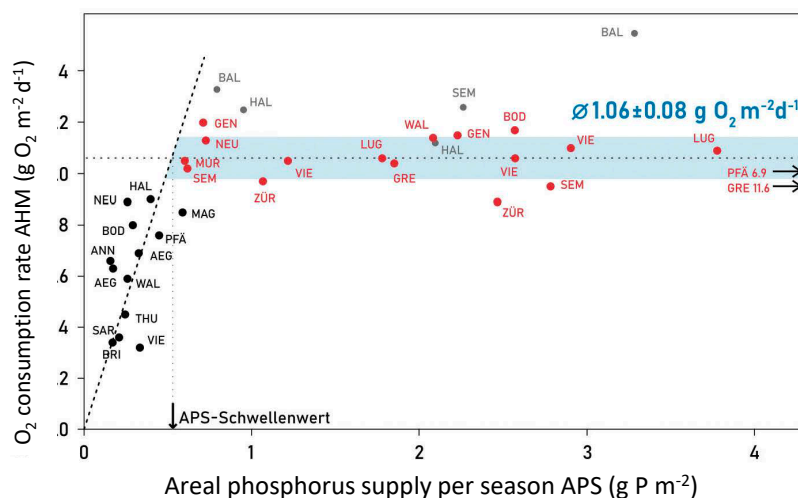
This multidisciplinary project, launched in 2018, is a joint effort by a consortium from EPFL, University of Lausanne, University of Geneva, University of Applied Sciences and Arts of Southern Switzerland, Eawag and University of Constance. The goal is to better understand the changes in primary production following the reduction of nutrients inputs in Lakes Léman, Constance and Lugano. During 2020, the different subprojects collected further data and started to write peer-reviewed publications, expected for 2021. An annual workshop is planned on 26th January 2021.

Project with the Federal Office for the Environment

The project goal is to propose an estimate of primary production for practitioners based on routine monitoring datasets. To follow the project progresses, two meetings were held on 23rd January and 20th October 2020 in FOEN.

In the first publication in Aqua&Gas, we disseminated the discovery that the O₂ consumption rate in the lake hypolimnion stayed surprisingly constant even with a massive reduction of phosphorus. It is only below the threshold of 0.54 g P m⁻², that O₂ consumption becomes proportional to P inputs. This threshold is lower than the value of 30 µg P L⁻¹, that was expected to bring the primary production down to a mesotrophic level. This difference can be explained by the enormous capacity of phytoplankton to increase their C:P ratio. Another article in Aqua and Gas, and two other research papers were submitted end 2020.

The pipeline for remote sensing products were also prepared, so that practitioners could have access to images of Chl-a, Secchi depths and turbidity in the Datalakes webportal (www.datalakes-eawag.ch). A beta version is currently available.



In red: all APS-values above 0.54 g P m⁻². The blue band shows an average for all red points of 1.06 ± 0.08 g O₂ m⁻² d⁻¹. AHM starts to decrease proportional to P inputs, only below 0.54 g P m⁻² (in black). In grey: lakes artificially aerated. Figure from Müller et al. (2019, scientific publication) and Kiefer et al. (2020, Aqua&Gas).

SEED PROJECTS FOR PRIMARY PRODUCTION

Lepori et al: Software for lake productivity

SoftLake is a software to estimate primary production (PP) of a lake in a given location where monthly profiles of PP, temperature, chlorophyll-a and irradiance are observed. During 2020, along with minor bug-fixes on the basic library, the software was improved with the combination of different models, statistical indicators for the results, and clearer documentations. A methods paper is planned for 2021. The software was tested on Lakes Léman and Lugano, which might lead to another publication.

Reference links: Documentation: <https://ist-supsi.gitlab.io/softlake/>

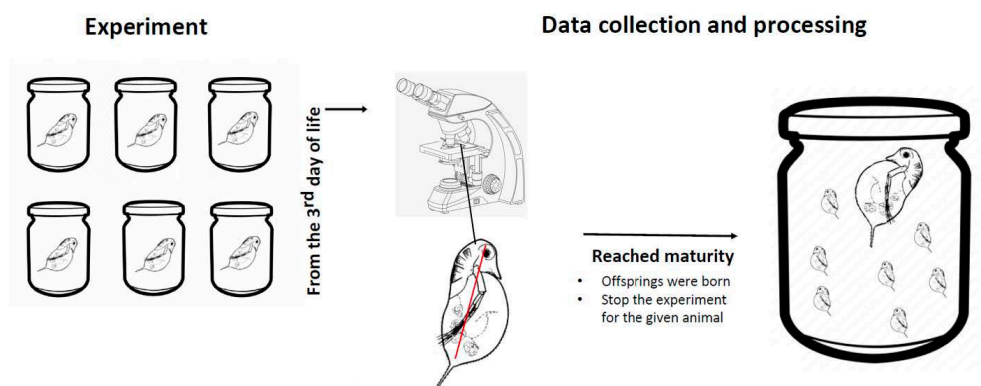
Package: <https://pypi.org/project/softlake/>

Repository: <https://gitlab.com/ist-supsi/softlake>

Ibelings et al: Trophic bottlenecks in Lake Léman

The results of the first *Daphnia* experiment have clearly shown a significant effect of the nutritional quality (C:P) on the reproduction and growth rate of *Daphnia* sp. The high-phosphorus treatment resulted in significantly higher *Daphnia* fitness than low-phosphorus treatment. Even if it is complicated to extrapolate the laboratory observations to the lake, the reduction of the external phosphorus input and the resulting increase in C:P might have negatively affected the nutritional quality of the seston, and in the end may harm the *Daphnia* potential for reproduction and growth. These negative impacts could induce a reduction of the *Daphnia* abundance, as already observed, impacting thus, the rest of the foodweb (transfer *Daphnia* to Bythotrephes to coregonids).

The next steps are to vary the food quality with the food quantity. The LIMNC financed a project follow-up, where the impact of food quality and quantity of different types of algae will be evaluated on *Daphnia*.

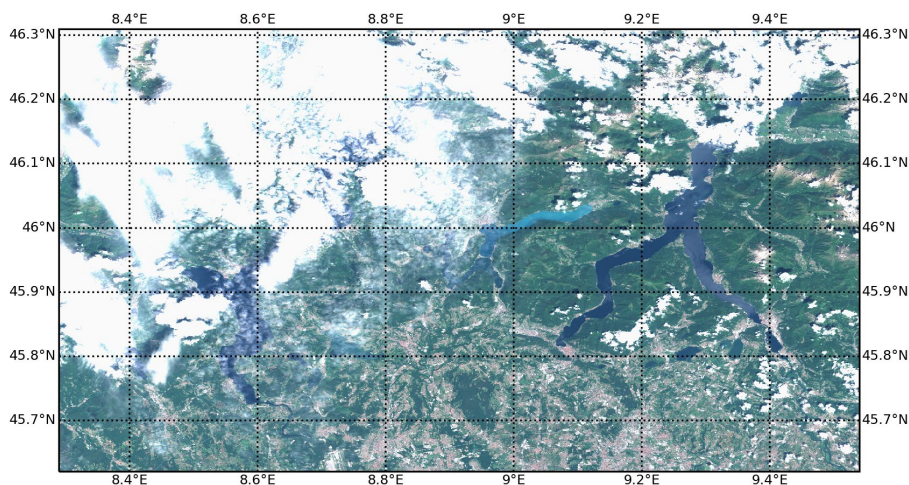


Design of the first *Daphnia* experiment, low versus high C:P ratio. Six *Daphnia* genotypes were exposed to two food qualities. Their growth and reproduction rates were measured.

SEED PROJECTS FOR PRIMARY PRODUCTION

Odermatt et al: Whitening detection and optical characterization (W-DOC)

In 2020, the w-doc processing chain was linked to a frontend (www.eawag-datalakes.ch) and a new backend (CreoDIAS) with an improved Sentinel-2 data repository. As such, the Datalakes platform will allow to disseminate alert products efficiently. On 4th June, a whitening event was reported on Lake Lugano, which lasted for more than a month. Unfortunately, our research group renounced to field work due to the Covid-19. To mitigate this gap, Eric Tharmalingam performed a literature review for his Bachelor Thesis on the inherent optical property measurements for calcite precipitation events. The implementation and evaluation of additional algorithms was facilitated by Jasmin Kesselring (UZH master student), who was employed as a trainee between May and August 2020.



Sentinel-2A image of the southern perialpine lakes, showing a whitening in Lake Lugano (centre).

Peeters et al: Primary productivity of different phytoplankton groups in Lake Constance

In 2020, multiple different analyses investigated the technical aspect of the diel O_2 technique and the application of ^{18}O to support the estimation of metabolic rates. A first test was performed in mesocosms to see if these techniques are sufficient to assess differences in specific production of phytoplankton communities with different composition. If this specific primary production can be distinguished between the different phytoplankton communities in the controlled mesocosm environments, the next step will be to attempt to assess community specific production in the open water of the lake ecosystems.

WITHIN THE LIMNOLOGY CENTER

Since 15th March 2020, Guillaume Cunillera works as a technician on LÉXPLORE platform. He managed to become rapidly efficient despite the COVID-19 restrictions. He greatly improved the practicability on the platform, and worked closely with APHYS researchers. He was a great support to Sébastien Lavanchy, who could dedicate more time as chief technical officer. Everybody on LÉXPLORE likes his friendly attitude and thanks him for his dedicated work!



Guillaume Cunillera taking water samples on LÉXPLORE



Isabel Kiefer

Since 15th January 2020, Isabel Kiefer was employed to work on the Primary Production with the Federal Office for the Environment to link the research to the practice. She published an article and submitted another one in Aqua and Gas. She also prepared a brochure explaining the method in detail. We are thankful for a great job. She will finish her contract on 30th January 2021.

LéXPLORE

In Europe

CARTEL, France: Dr. Jean Guillard, Dr. Viet Tran-Khac, Philippe Quétin, Dr. Serena Rasconi, Dr. Isabelle Domaizon, Dr. Orlane Anneville, Chloé Goulon

Marine Research Institute (IIM-CSIC), Spain: Dr. Miguel Gil Coto

In Switzerland

University of Lausanne: Prof. Marie-Elodie Perga, Prof. Torsten Vennemann, Dr. Nicolas Escoffier, Dr. Thibault Lambert, Aurélien Ballu, Gabriel Cotte, Pascal Perolo

University of Geneva: Prof. Bastiaan Ibelings, Dr. Jean-Luc Loizeau, Roxane Fillion, Julio Alegre Stelzer, Jorrit Mesman, Dr. Mridul Thomas, Ena Suarez Bolanos, Matthieu Devanthery, Sebastien de Loes, Andrea Gallorini

Eawag: Prof. Kristin Schirmer, Prof. Piet Spaak, Dr. Damien Bouffard, Dr. Stuart Dennis, Dr. Carolin Drieschner, Dr. Peter Isles, Dr. Daniel Odermatt, Dr. Beat Müller, Dr. Francesco Pomati, Linda Haltiner, Patrick Kathriner, Jenny Maner, Michael Plüss, James Runnals, Thomas Steinberger, Tomy Doda, Dr. Jonas Sukys, Dr. Artur Safin, Dr. Abofazel Irani Rahaghi, Dr. Janssen Elisabeth

University of Applied Sciences and Arts of Southern Switzerland: Dr. Massimiliano Cannata, Dr. Camilla Capelli, Dr. Fabio Lepori, Daniele Strigaro

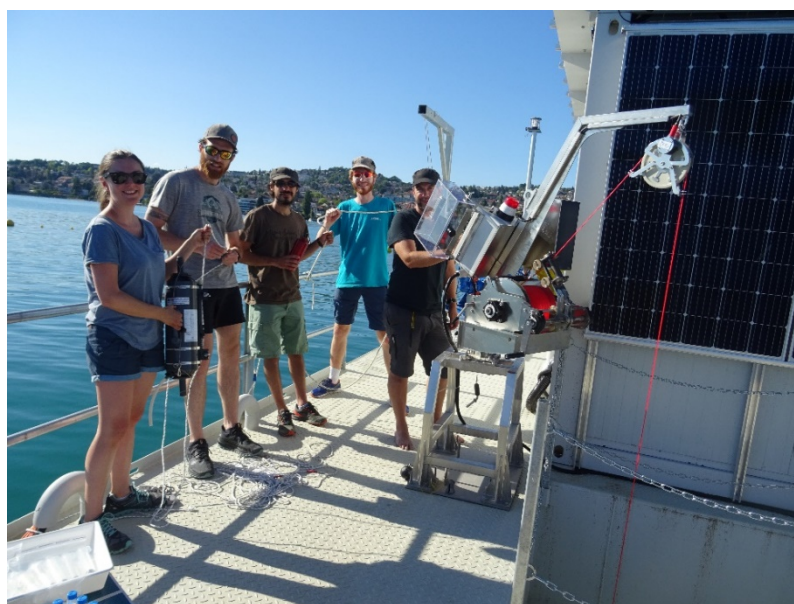
Federal Office for Environment: Rémy Estoppey, Dr. Manuel Kunz

Swiss Data Science Center: Fotis Georgatos, Bouillet Eric, Perez Cruz Fernando

Swiss Center for Applied Ecotoxicology: Dr. Benoît Ferrari, Dr. Rébecca Beauvais, Dr. Carmen Casado-Martinez, Christina Thiemann

ETH Zürich: Dr. Julie Lattaud

Hydromea: Dr. Alexander Bahr, Dr. Felix Schill



Researchers during a 24h sampling on LéXPLORE

LéXPLORE

Within EPFL

APHYS-Margaretha Kamprad Chair: Prof. Johny Wüest, Dr. Hannah Chmiel, Dr. Bieito Fernandez Castro, Dr. Shubham Krishna, Dr. Camille Minaudo, Dr. Natacha Tofield-Pasche, Dr. Hugo Ulloa, Dr. Sebastiano Piccolroaz, Sebastien Lavanchy, Guillaume Cunillera, Isabel Kiefer, Lucas Serra Moncadas

Central Environmental Laboratory: Dr. Florian Breider, Karine Vernez, Sylvain Coudret

Environmental Chemistry Laboratory: Prof. Tamar Kohn, Dr. Anna Carratalà

Laboratory of Geographic Information Systems: Dr. Stéphane Joost, Dr. Elia Vajana, Annie Guillaume

Distributed Intelligent Systems and Algorithms Laboratory: Prof. Martinoli Alcherio, Anwar Quraishi

Laboratory of Environmental Toxicology: Prof. Kristin Schirmer

The Ecological Engineering Laboratory: Prof. Andrew Barry, Mehrshad Foroughan Benjamin Graf, Htet Kyi Wynn.

Wind Engineering and Renewable Energy Laboratory: Prof. Fernando Porté-Agel

Environmental Microbiology Laboratory: Prof. Rizlan Bernier-Latmani

Galatea Laboratory: Prof. Yves Bellouard, Dr. Manon Tardif, Ivo Arabadzhiev, Sebastiano Ribi, Isles Petr

Microsystems Laboratory 4: Prof. Philippe Renaud

Laboratory of Biological Network Characterization: Jonathan Selz, Adam Nicolas, Prof. Sebastian Maerkl

PRIMARY PRODUCTION

In Europe:

University of Constance, Germany: Prof. Frank Peeters

INRAE-Thonon-les-Bains, France: Dr. Orlane Anneville, Dr. Serena Rasconi

In Switzerland

University of Geneva: Prof. Bastiaan Ibelings, Ena Suarez Bolanos, Roxane Fillion

Eawag: Dr. Beat Müller, Dr. Daniel Odermatt, James Runnals, Patrick Kathriner, Dr. Abolfazl Irani Rahaghi

University of Lausanne: Prof. Marie-Elodie Perga, Pascal Perolo, Dr. Thibault Lambert, Dr. Nicolas Escoffier, Gabriel Cotte, Prof. Torsten Vennemann

University of Applied Sciences and Arts of Southern Switzerland: Dr. Fabio Lepori, Dr. Massimiliano Cannata, Dr. Camilla Capelli, Daniele Strigaro

Within EPFL

APHYS-Margaretha Kamprad Chair: Prof. Alfred Wüest, Dr. Hannah Chmiel, Dr. Bieito Fernandez Castro, Dr. Shubham Krishna, Dr. Camille Minaudo, Dr. Natacha Tofield-Pasche, Dr. Hugo Ulloa, Sebastien Lavanchy, Dr. Sebastiano Picoolroaz, Guillaume Cunillera, Isabel Kiefer, Lucas Serra Moncadas

SCIENTIFIC PUBLICATIONS

Life under Ice project

Perga M-E, Syarki M, Kalinkina N, and Bouffard D (2020): **A rotiferan version of the punishment of Sisyphus?** *Ecology* 101(3): e02934.

<https://doi.org/10.1002/ecy.2934>

Chmiel HE, Hofmann H, Sobek S, Efremova T, and Pasche N (2020): **Where does the river end? Drivers of spatiotemporal variability in CO₂ concentration and flux in the inflow area of a large boreal lake.** *Limnology and Oceanography* 65, p1161-1174, <https://doi.org/10.1002/lno.11378>

Subetto D, Rybalko A, Strakhovenko V, Belkina N, Tokarev M, Potakhin M, Aleshin M, Belyaev P, Dubois N, Kuznetsov V, Korost D, Loktev A, Shalaeva N, Kiskina A, Kostromina N, Kublitskiy Y and Orlov A (2020): **Structure of Late Pleistocene and Holocene Sediments in the Petrozavodsk Bay, Lake Onego (NW Russia).** *Minerals* 964, <https://doi.org/10.3390/min10110964>

Primary Production project

Lepori, F., Capelli, C. (2020): **Effects of phosphorus control on primary productivity and deep-water oxygenation: insights from Lake Lugano (Switzerland and Italy).** *Hydrobiologia*. <https://doi.org/10.1007/s10750-020-04467-9>

Peeters, F., J. Encinas Fernandez, H. Hofmann (2020): **Reply for comment on “on the calculation of lake metabolic rates: Diel O₂ and ^{18/16}O technique”** by Peeters et al. [Water research 165 2019,114990]. *Water Research* 180, 115849. <https://doi.org/10.1016/j.watres.2020.115849>

Gabriel Cotte, Torsten W. Vennemann (2020): **Mixing of Rhône River water in Lake Geneva: Seasonal tracing using stable isotope composition of water.** *Journal of Great Lakes Research* 46 (4), 839-849.

Isabel Kiefer, Thomas Steinsberger, Alfred Wüest and Beat Müller (2020): **Sauerstoffzehrung in Seen, Aqua & Gas**, 100(7/8), 62-70. [here](#)

Odermatt D., J. Runnalls, J. Sturm, A. Damm (2020): **SenCast: Copernicus - Satellitendaten auf Knopfdruck.** *Geomatik Schweiz* 9. [here](#).

LéXPLORE

Cotte G and Vennemann T (2020): Processes driving nutrient dispersion in Lake Geneva during the stratification period (study using the LéXPLORE platform). Chapter from PhD thesis at UNIL.

CONFERENCES

18th Swiss Geoscience Meeting

Limnology in Switzerland and the new LÉXPLORE infrastructure

Bouffard Damien, Tofield-Pasche Natacha and Döring Michael

Talks:

Cannata M, Strigaro D, Lepori F, Capelli C, Veronesi M, Rogora M, Brovelli M, Magni D: **SIMILE: An integrated monitoring system to understand, protect and manage sub-alpine lakes and their ecosystem**

Chmiel HE, Fernandez Castro B, Minaudo M, Krishna S, Perolo P, Rasconi S, Wüest A: **Summer primary and ecosystem production in Lake Geneva diagnosed from high-resolution in situ oxygen measurements**

Cotte G, Vennemann T: **Nutrient cycling at the LÉXPLORE platform of Lake Geneva, Switzerland.**

dos Santos Correia F, Ray A, Fillion R, Spaak P, van de Waal D, Ibelings B.W: **Trophic bottlenecks in Lake Geneva**

Fernandez Castro B, Bouffard D, Troy C, Piccolroaz S, Lavanchy S, Chmiel HE, Ulloa HN, Sepúlveda Steiner O, Wüest A: **Seasonality of the mechanical energy budget in a large lake: Lake Geneva (Switzerland-France)**

Irani Rahaghi A, Minaudo C, Damm A, Odermatt D: **Can the bio-optical stratification in a large lake be estimated using temperature profiles and meteorological data?**

Krishna S, Ulloa H N, Kerimoglu O, Minaudo C, Anneville O, Wüest A: **Model-based data analysis of the effect of winter mixing on primary production in a lake under reoligotrophication.**

Minaudo C, Odermatt D, Bouffard D, Irani Rahaghi A, Lavanchy S, Wüest A: **Diel patterns in water inherent optical properties of Lake Geneva and their physical and biogeochemical drivers**

Odermatt D, Minaudo D, Kesselring J, Runnalls J, Wüest A: **Satellite Earth observation products for lake research**

Pasche N, Bouffard D, Guillard J, Ibelings B, Lavanchy S, Perga M-E, Wüest A: **LÉXPLORE – the novel platform for Léman exploration**

Rüegg J, Perga M-E, Lane S: **Does mixing of stream and lake water create mini-estuaries in lotic-lentic transition zones?**

Safin A, Bouffard D, Ramón CL, Runnalls J, Ozdemir F, Georgatos F, Tagasovska N, Minaudo C, Šukys J: **A comprehensive Bayesian data assimilation platform for a 3D hydrodynamic model of Lake Geneva**

Tardif M, Rey S, Ribi S, Arabadzhiev I, Ibelings B, Pomati F, Bellouard Y: **Optofluidic sensor for in-situ monitoring of phytoplankton in Lake Geneva**

Worms I, Slaveykova V: **Characterization of dissolved organic matter (DOM) by asymmetrical flow field-flow fractionation with multidetection (AF4-MD) and its potential applications to investigate dynamic of changes in DOM composition and properties occurring in the freshwater continuum**

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Posters:

Bouffard D, Runnalls J, Baracchini T, Bouillet E, Chmiel HE, Doda T, Fernández Castro B, Georgatos F, Lavanchy S, Minaudo C, Ozdemir F, Odermatt D, Perga M-E, Perolo P, Piccolroaz S, Plüss M, Råman Vinnå L, Schmid M, Safin A, Šukys J, Tran-Khac V, Ulloa HN, Ramón CL, Wüest A: **Datalakes, a data platform for Swiss lakes**

Råman Vinnå L, Wirth S: **Assessing pockmark activity in lakes under influence of drainage area processes**

Doda T, Ramón CL, Ulloa HN, Brennwald MS, Kipfer R, Schubert C, Wüest A, Bouffard D: **Lateral transport of dissolved gases by cooling-driven density currents in a small temperate lake**

Escoffier N, Perolo P, Lambert T, Rüegg J, Odermatt D, Adatte T, Vennemann T, Perga M-E: **Triggers of whiting events in Lake Geneva**

Foroughan M, Lemmin U, Barry DA: **Signatures of coherent flow structures in the atmospheric surface layer over Lake Geneva**

Gallorini A, Loizeau J-L: **MetOxiC: Methylmercury in Oxic water Column**

Haltiner L, Dennis SR, Spaak P: **Life in the deep: colonisation by Dreissena along a depth gradient**

Maner J, Drieschner C, Ebi C, Schönenberger R, Angst L, Bloem S, Solsona M, Renaud P, Schirmer K: **RAINBOWflow CHIPonline: A fish cell-based impedance sensor to monitor water quality**

Perolo P, Fernandez-Castro B, Escoffier N, Lambert T, Bouffard D, Perga M-E: **Wave breaking integration for predicting air-water gas exchange in large lake**

Piccolroaz S, Fernandez Castro B, Chmiel HE, Wüest A: **Lake-atmosphere CO₂ fluxes in Lake Geneva: disentangling the role of physical and biological processes in affecting diel and seasonal patterns**

Schmid M, Dami J, Bouffard D: **Lake temperature monitoring – temporal and vertical resolutions required for observing climate change impacts**

OTHER CONFERENCES

Bouffard D: **Datalakes, a data platform for lakes**, 22.10.20, GLEON 21.5 Virtual Meeting, Keynote presentation.

Tofield-Pasche N: **LÉXPLORE: Exploration du Léman**, 7.10.20, Société Vaudoise de Sciences Naturelles in Palais de Rumine, Lausanne. Public Presentation.

Fernandez Castro B, Troy C, Doda T, Chmiel HE, Minaudo C, Ulloa HN, Serra L,

Sepúlveda-Steiner O, Bouffard D, Wüest A: **Seasonality of the mechanical energy budget in a large lake, Lake Geneva (Switzerland-France)**. Workshop on Physical

Processes in Natural Waters 2020. 15-18.06.20. Online meeting. Oral presentation.

ARTICLES

18.11: Three spin-offs make the finals of a deep tech startup competition, [EPFL News](#)

22.09 : Optical Modem for Ultrafast Underwater Communications, [EPFL News](#)

Promote LéXPLORE Platform

In 2021, the Limnology Center plans to promote LéXPLORE at an international level. A publication on LéXPLORE opportunities and several presentations at international conferences should better position LéXPLORE internationally and attract additional researchers with new expertise and collaborative projects. In 2020, LéXPLORE joined the Global Lake Ecological Observatory Network (860 members), which will open many opportunities for data-driven studies.

The Center will also continue to lead the management of LéXPLORE and the scientific projects, in collaboration with our partner institutions. We are expecting the first publications for 2021, which should also help to advertise the platform.



LéXPLORE and the protection circle (Florian Bentele, Photographer Stuttgart)

Preparing the transition

Before all, we would like to warmly thank Johny Wüest for his commitment, talents, visions in developing the Limnology Center into an attractive hub for researchers.

The projects on primary production will be officially finalized in September 2021. We are expecting around 10 scientific publications. In the future, we plan to continue sharing ideas and results within this consortium. We work towards launching a comparative study of the four large border lakes.

In 2021, we will aim at the integration of the LéXPLORE platform within the new EPFL-UNIL Center CLIMACT. We will seize the opportunities in remote sensing, and ensure that LéXPLORE becomes a ground truthing hub, where data are continuously transmitted to the European Space Agency.