Student Chapter Annual Report Cover Page

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Month/Year Reported: From ___________________________(mm/yyyy) – To _______________________________(mm/yyyy)

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Chapter Executive Committee (in office during the time frame captured on this report) (type “Vacant” if position not filled): The new committee is reported on the Student Chapter Membership Information form (SCMIF).

President: Bruna de Freitas Santos
VicePresident: Rodrigo Okasaki
Secretary: Rafael Golanda
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Chapter Academic Sponsor:
Name: Caetano Juliani
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Sponsoring Institution or Company(name): Nexa Resources
SEG Student Chapter USP

Annual Report 2020
1. Introduction

The Student Chapter from University of São Paulo (SC-USP) was created in 2011 with the objective of uniting professionals, students and academy professors with common interest in the field of economic geology. Our student chapter aims to advance and disseminate the knowledge by promoting debates, lectures, field trips, workshops and presentations given by professionals that have already worked or still work on the field of economic geology, as well as professors and postgraduate students. By attracting former and present-day industry professionals we also intend to break the barrier between the mining industry and the academy, a partnership which both parts can benefit from.

For the year of 2020 our Student Chapter executive committee consisted of two MSc students and three graduation students. We also counted with the support of many other postgraduate and undergraduate students who are members of SEG.
2. Pandemic COVID-19

The plans developed by our Student Chapter USP management for 2020 were strongly focused on the specialization of members and students of our university with support from software companies teaching essential courses for the industry and student professionalization, such as Seequent softwares (OASIS Montaj, Leapfrog) and software from Datamine (Studio RM). A Mineral Liberation Analyzer (MLA) course was also planned for early May and a Geophysical Characterization Course Applied for Mineral Exploration with one of our Institute professors was also on our schedule. However, due to the COVID-19 Pandemic, all of our courses were canceled, regarding the government requirements for cancellations of face-to-face classes. Therefore, we developed virtual projects to teach and be updated about the world of economic geology to members, professionals, and students on our various virtual pages.

3. SEG Student Chapter USP 2019 - 2020 Activities

The activities that our Student Chapter organized during the year of 2019-2020 were short-courses, lectures, teaching assistance for the undergrads, monthly publication of the “SC-SEG USP Newsletter”, a workshop, and meetings with both members and non-members. The main points debated on such meetings were: the I Workshop of Economic Geology of USP, ideas for fundraising, suggestions for future lecturers and courses, discussion and debate on themes related to economic geology, exchange papers, books, and new virtual projects.

It must be highlighted that our Student Chapter counts with a Linkedin page (https://www.linkedin.com/in/scsegusp/), an Instagram profile (@seg_usp) and a channel on Youtube (Youtube page) that has been used with the purpose of advertising, videos from our events and field trips, sharing our newsletters as other papers about economic geology and connecting to professional and students.

On our official website (https://www.scsegusp.com/), we developed two more pages on our menu. The first is our News Blog, where we weekly add the 10 biggest breaking news in the world of mining and the second, the teaching project page, where we develop quick posts with practical and accessible content for students to have another source of consultation on metallogeny, economic geology and mineral prospecting subjects.
a. Teaching Assistant

Four members of the SC-SEG USP were enrolled as teaching assistants in the classes of Geological Mapping, Economic Geology, Genesis of Mineral Deposits, and Mineral Exploration for the undergraduates at the University of São Paulo. This is a good chance to clarify students' questions and doubts and also a good opportunity to get them familiarized with the field of economic geology and prospecting world.

b. Student Chapter USP Newsletter

For the present year our Student Chapter continued publishing a monthly newsletter, the SC-SEG USP Newsletter, with over 25 published editions in total, totally written by one of our members. The main goal of this publication is to debate ongoing discussions and issues regarding the mining industry as well as expose the news and updates on the economic geology field. It is an opportunity for our members to develop the knowledge on the subject, the critical sense, and leave your opinion on the theme discussed. All our newsletters can be downloaded in PDF format on our website (scsegusp.com/newsletter).

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C. Organized Events

During the fourth trimester of 2019 and the first trimester of 2020, our group worked in order to organize one workshop, presentations, and short-courses.

- **Lecture “Global Trainee Vale 2020”**
  
  On September 26th, 2019, our Student Chapter brought to our members and students the recruiters from Vale’s trainee process. Vale is a private company ranking as one of the largest miners in the world, operating in more than 9 countries. There was a live broadcast on our Facebook page, with a nice chat with Beatriz Carvalho, learning and getting to know a little more about the selection processes and profiles required by large companies such as Vale.

- **First Economic Geology Workshop - Mineral Deposits in the Amazon Craton and Technological Innovations**
  
  The event happened between 06th and 08th November 2019 and it aimed to promote greater integration between students and companies of the mineral sector, with short courses in the morning (8 am to 12 pm) and lectures in the afternoon (2 pm to 6 pm).
The program of the first USP Economic Geology Workshop organized by the Student Chapter SEG USP with the theme: Mineral Deposits from Amazon Craton and Technological Innovations.

During the event, 4 short courses were given:

- Mineralogical and technological characterization of ores: techniques and applications (CETEM) by Dr. Reiner Neumann.
- DRONE Advanced Topics and Deal (DRONEVALK) by Gabriel Zacharias.
- QAQC principles for mineral exploration projects (GEOANSATA) by Glaucia Cuchierato.
- Mineral resources: from data analysis to resource classification (GEOVARIANCES) by Silvia Misk.

Three mini-courses were operated by private companies: DroneValk, GeoAnsata, and Geovariances, and one course was applied by the Mineral Technology Center (CETEM), a research unit of the Brazilian Ministry of Science, Technology, and Innovation. The courses were all focused on technological innovations and as support for the entry of
future professionals in the industry.

Pictures from the four short courses offered at our workshop. A. Mineralogical and technological characterization of ores: techniques and applications (CETEM) by Dr. Reiner Neumann. B. Drone Advanced Topics and Deal (DRONEVALK) by Gabriel Zacharias. C. Mineral resources: from data analysis to resource classification (GEOVARIANCES) by Silvia Misk. D. QAQC principles for mineral exploration projects (GEOANSATA) by Glaucia Cuchierato.

The lectures, on the other hand, were focused on the Amazon Craton and had a total of 16 speakers, including professors from our university and guests professors from several universities in the country. We had a few special guests participations from world-renowned mining companies:

➢ The Evolution of Amazon Craton - Professor Dr. Umberto Cordani (University of São Paulo)
➢ Remote Sensing by geobotanic in the Amazon: philosophy, concepts, and perspectives - Professor Dr. Teodoro Isnard (University of São Paulo)
➢ The Fractal Nature of Mineral Deposits and Implications for their Prospectivity: Case Study in the Mineral Province of Carajás - Professor Dr. Carlos Roberto de Souza Filho (University of Campinas - UNICAMP)
➢ Mineral Resource Estimation and Classification - Gustavo USERO (Regional Director for Latin America and the Caribbean at Geovariances)
➢ The IOCG System of the Carajás Mineral Province - Professor Dra. Lena Monteiro (University of São Paulo)
➢ Geochemical Signatures of IOCG Deposits in Carajás - Carlos Augusto de Medeiros Filho (Vale SA)
➢ Carajás: Exploration challenges for the discovery of new deposits - Rodrigo Martins (Exploration Manager Brazil - Vale SA)
➢ Niobium: Geological and economic aspects - Yuri Bugarin (CBMM)
➢ Geology of the Aripuanã Deposit - Julio Cezar Santos (Exploration Manager NEXA Resources)
➢ Granites from the Tin Province of Rondônia and surroundings: Rare Metals - Professor Dr. Jorge Bettencourt (University of São Paulo)
➢ NEXA Resources - Juliano Alex Ferreira (General Manager of exploration NEXA Resources Brazil)
➢ Artificial intelligence applied to mining - Professor Dr. Cleyton Carneiro (University of São Paulo)
➢ Mineral Province of Tapajós - Msc. Lucas Cassini (University of São Paulo)
➢ Alta Floresta Mineral Province - Professor Dr. Rafael Assis (University of São Paulo)
➢ Exploration geophysics in the Alta Floresta province - Professor Dr. Vinicius Hector Louro (University of São Paulo)

During the event, a space was also opened for students to present their research projects in progress to everyone in our Speed Talk Section. Students were selected by submitting abstracts due to limited time. During the event, the selected students made their presentations, up to 5 minutes and 5 slides, aimed at students and professionals attending the event.

Participating students:
➢ Lucas Brito - "Identification of Geochemical Vectors in the Search for Hydrothermal Alteration Centers in the Polymetallic Deposit of Santa Maria (RS - Brazil)"
➢ Debora Amato - "Big Data Analysis and the application in exploratory geochemistry"
➢ Ivan Pereira - "Use of open access data in Mineral Exploration: an example of application in the Castro Basin - PR - Brazil"
➢ Lucas Bassan - "Why is natural graphite important?"
➢ Bruna de Freitas - "The extraordinary preservation of volcanic rocks in the Amazon"
➢ Guilherme Troncon - "Spectral analysis of regoliths from the region of Nova Brasilândia D'Oeste (RO - Brazil)"
➢ Luigi Carboni - "Application of kriging of indicators for three-dimensional geological modeling"


To end the event Ms. Silvandira Góes (OMYA), Ms. Glauca Cuchirato (GeoAnsata / WIMB), Diana Ravagnolli (MGA) and Carla Galan (Structural Group) were invited to participate in our panel discussion: Women in mining, where they showed and discussed some important statistics of women in the mineral sector and it was complemented by the stories of the invited professionals.
The workshop was offered with a discount to those who were members of the Society of Economic Geologists. The registration fees for students were 75% lower than those for professionals, to encourage student participation throughout the event. Discounts were also applied to professional members of the Society of Economic Geologists. Among students, SEG student members received a 60% discount on the admission fee, in order to bring more students from our university to our Chapter.

As a result of this great work, we obtained more than 85 registrations for the event. Our maximum limit of registrants would be 100 people according to the availability of seats in the halls where the event took place. When we completed 85 registrations, we ended the registrations indicating that the event was already sold out, since we would still have to consider the presence of speakers. Even so, we created a waiting list in case
there was a withdrawal from any of the subscribers. The waiting list had another 10 participants, who unfortunately were unable to participate in our event.

In order to understand a little about the registrants, when registering for the event, they filled in some data to obtain some statistical indications. Of the 85 registered participants, 71 were students (83.5%) and 14 were from the industry (16.5%). We obtained students from all undergraduate and graduate years, but we highlight greater participation of students in the third, fourth, and fifth years of undergaraduation, and students of the master's degree.

➢ 20 students enrolled in the master's
➢ 3 students enrolled in the doctorate
➢ 14 students enrolled in the fifth year of graduation
➢ 14 students enrolled in the fourth year of graduation
➢ 12 students enrolled in the third year of graduation
➢ 8 students enrolled in the first/second year of graduation or special students.

Of these students, 68.2% were students at our university (Universidade de São Paulo - USP), but we obtained enrollments from students at the Universidade Estadual Paulista (UNESP), University of Campinas (UNICAMP), Federal University of Bahia (UFBA), Center University of Belo Horizonte (UNIBH), University of Brasília (UnB), Federal University of Mato Grosso (UFMT), State University of Rio de Janeiro (UERJ) and Federal Rural University of Rio de Janeiro (UFRRJ).

Talking a little about the participating professionals, they were mainly from private industry companies, such as NEXA Resources, GeoAnsata, Drone Valk, Vale SA, Geovariances, Rio Tinto, Geological Survey of Brazil (CPRM), Private Consultants, and Particle Software.

Regarding the speakers, 24 speakers were invited to participate in our workshop. Professors from universities (USP and UNICAMP, 10 in total) and professionals working in prestigious companies (NEXA Resources, Drone Valk, Geovariances, Vale AS, CBMM, OMYA, MGA, GeoAnsata, and Cetem-RJ) were invited (14 in total).

Among all enrolled students, only 20 were members of the Society of Economic Geologists, and throughout the event, we encouraged participation in the Student Chapter USP.
It is such great satisfaction that we were able to manage good quality and a very successful event. We received some feedback from students about the event:

“I really liked the workshop. The distribution of the speakers over the days was good to maintain interest throughout the event. The mix of professionals and teachers was also a strong point. Congratulations to the organizers.” - Débora Amato (Msc Student at USP).

“I would like to thank the organization for its efforts in carrying out the workshop. This effort made the final product the construction of an excellent program, with current themes from different areas involving economic geology.” - Yuri Valle (Undergraduate student at UERJ).

“The workshop brought lectures and courses with interesting and useful themes. A strong point of the event was the organization: from the website with the complete agenda, through registration, through the email with instructions the previous day, to the delivery of certificates. Congratulations to the whole team! ”- Fernanda Ferreti (Special Student at USP).

“I found the diversity of the lectures to be very good, including both issues more focused on the labor market and more" theoretical "subjects. The conversation about the situation of women in mining was great, presenting several points of view in addition to a general context of the current situation of women. Congratulations to the organizers.” - Ana Maria Afonso Sena (Graduate student at USP).
The event had two main sponsors: Rio Tinto and MGA Company. Rio Tinto offered a good amount to make this event happen, without their support this event would not have happened. MGA Company provided materials support such as pens, notebooks, identification badges, folders, and straps as gifts for the event.

![Images of provided materials](image)

*Pictures of the provided materials for the event attendants. A. Notepad with pen B. Identification badge C. Neck strap.*

- **Presentation of the Student Chapter USP at the Integration USP Week**

To promote the integration among students, our university, University of São Paulo, promotes a week in which regular classes are replaced by lectures, fun competitions, debates, panel discussions, among other activities between the new students and the veteran students. During this week, from March 2nd to 3rd 2020, the Student Chapter USP also participated, presenting a lecture about our group and about the Society of Economic Geologists, talking a little about the objectives of our chapter and the activities that we promote throughout the year for all students at our Geoscience Institute. We participate to receive and integrate our future members and geologists.
Picture of our members presenting the Student Chapter SEG USP during Integration USP Week for students and parents.

- **Datamine Studio RM for Deposit Modeling**

  Course offered on March 6th, 2020 for members and non-members by one of our committee secretaries, Lucio Massari. The course promoted the use of Studio RM software from DATAMINE Company for students at our institute. The course focused on how the software can assist in modeling deposits and in geological modeling, in which participants used hypothetical data from drilling rock samples and geochemical analysis to build their own geological model of an imaginary deposit. A partnership between the company Datamine and our Student Chapter USP managed to develop this great work in our computer lab.

Pictures from our Datamine Short Course Studio RM for Deposit Modeling in our computer lab.
Mini-Course Advancing to the Future: Artificial Intelligence in Geosciences - Fundamentals, Importance, Applications, and Examples

During the COVID-19 pandemic, the Student Chapter USP, in partnership with the USP Geosciences Institute and the Postgraduate Program and Mineral Resources and Hydrogeology, took the initiative to develop a totally free and online mini-course for students and professionals from the areas of Geosciences and Engineering focused on the use of artificial intelligence.

In the last decades, with the increase of the processing capacity and the reduction of the costs of computers, the Artificial Intelligence (AI) algorithms have been intensely developed and their use has shown great efficiency in the solution of the most varied scientific, social and economic problems. The intensive use of AI in geosciences has opened up a wide field of study, from basic geology, including geological mapping, to the areas of environment, engineering geology, teaching, hydrogeology, mineral resources, energy, geotechnologies, etc. The field of AI called Machine Learning encompasses a wide range of applications in all these areas, which motivated the development of this mini-course presented in the form of a cycle of lectures, whose main objective is to provide students of Geology and related areas with information about the method, knowledge of some applications and their potential use.

The mini-course took place between August 26 and September 18, 2020, on Wednesdays and Fridays, with up to two lectures per day with a maximum duration of 1 hour each. The lectures were broadcast live on the Web Conference platform for all those registered. The event also included the creation of a platform (website http://igc.usp.br/ia2020/) for registration, information on certificates, programming, and any doubts.

We obtained a total of 13 speakers, including professors from our and other universities, doctors and masters specialists who have stood out in the national and international in the field of AI subjects, in addition to professionals in the field of world-renowned companies.

Speakers of the event and their themes presented:

➢ Theme: Implicit Modeling in the Mining Industry, Seequent path to cloud solutions for Geosciences | by Ignacio Torresi (Seequent Solutions Director, Geostatistics) and Julia Oliveira (Seequent Solutions - Senior Technical Leader Latin America).
Theme 1: Machine Learning for generating predictive lithological maps - Module 1 - Introduction to Machine Learning and case studies on predictive lithological maps. Theme 2: Module 2 - Practical class for the generation of predictive lithological maps | by Iago Costa (Geological Service of Brazil - CPRM - Directorate of Geology and Mineral Resources)

Theme 1: Modeling of Cu-Au Prospectivity in the Carajás mineral province (Brazil) through Machine Learning: dealing with imbalanced training data. Theme 2: Mapping of mineral prospective using Machine Learning techniques | by Elias Martins (Geological Service of Brazil - CPRM - Directorate of Geology and Mineral Resources, Executive Coordinator Center for Technological Development - CEDES)

Theme 1: Carajás - Archean crust and metallogenic zones in the Amazonian craton sensed by satellite gravity data. Theme 2: Proxies for Basement Structure and Its Implications for Mesoproterozoic Metallogenic Provinces in the Gawler Craton | by João Gabriel Motta (IG-UNICAMP)

Theme: Unsupervised Machine Learning for the Definition of Geological and Geometallurgical Domains | by Gustavo Usero (Geovariances)

Theme: Data science in the elaboration of geological maps: supervised and unsupervised developments | by Cleyton de Carvalho Carneiro (Professor at Department of Mining and Petroleum Engineering, USP Polytechnic School)

Theme: Machine Learning techniques applied to the exploration of the Alta Floresta Province in Alta Floresta | by Prof. Dr. Vinicius Louro (Professor at Department of Sedimentary and Environmental Geology - IGc-USP) and Victor Silva dos Santos (Student at IGc-USP and at Institut National de la Recherche Scientifique - INRS - Canada)

Theme: Artificial Intelligence - automating data analysis in Geosciences | by Marcelo Monteiro da Rocha (Professor at Department of Sedimentary and Environmental Geology - IGc-USP) and Débora Amato Lourenço Rossi (Student at the Graduate Program in Mineral Resources and Hydrogeology - IGc- USP)

Theme: Digital Petrography: mineralogy and porosity by Machine Learning models | by Rafael Rubo (Geologist at PETROBRAS)

Theme: Artificial Intelligence: a knowledge-enhanced Machine Learning Approach Applied to Natural Resource Industries | by Ulisses Thibe Mello (Director, Global Technology Outlook | IBM Distinguished Engineer IBM T.J. Watson Research Center)
The event had a total of 1567 people registered. The virtual platform used to transmit the event was Youtube, where the lectures were published on the new page of the new Artificial intelligence laboratory of the Geosciences Institute of the University of São Paulo, called IntelliGeo. To access the lectures, access the Youtube link.

As Youtube is a public platform, only those registered and those who confirmed their presence on the day of the event through a form via chat were those who received a certificate of participation. We reached a milestone of up to 600 people watching the event online simultaneously by each day.

To show how the event was a success in terms of numbers, the event had a total of more than 15 thousand views in all our 8 videos. The event, therefore, was 8 days long, with a maximum duration of 2.5 hours per video. The average number of live online participants in the event was 300 registered.

The numbers showed how much geologists and engineers are interested in upgrading to the new job market. The numbers also show how important events that are accessible to the entire population are. Our Student Chapter USP is immensely pleased to bring a current and very important subject to the world of geology and engineering together with professors and professionals for everyone as a free and online event. We are glad to make some difference to improve and expand the technological world focused on geology in a quick and accessible way. We always hope to bring good content and improve the teaching and professionalization of Brazilian geologists.
Pictures from the AI Event. **A.** Poster to publicize the event. **B.** Seequent Lecture. **C.** Mining course in mineral prospecting using Machine Learning techniques in ArcMap software. **D.** Machine Learning for generating predictive lithological maps - Practical class for generating predictive lithological maps. **E.** Practical class with Isatis Neomining from Geovariances on how to use unsupervised Machine Learning for the Definition of Geological and Geometallurgical Domains. **F.** Poster with the universities and companies that supported our event.

d. Events Attended by the Members

Whenever it was possible, our Student Chapter USP tried to attend events related to the economic geology field aiming our goal of spreading the knowledge and promoting our group in other universities.

During this year our attendance was much greater in events including national and international events. There are two highlighted points: three oral presentations and three posters presented by five members during the SEG 2019 - Santiago, Chile, between the
The Oral Session participants:

➢ The Cu-Au Furnas Deposit Metallogeny and Ore Typology, Carajás Province, Pará, Brazil by Maira Alves.

➢ Linking Geological and Mineralogical Characteristics to Metallurgical Recoveries: A case study from the Vazante Nonsulfide Zn Deposit, Central Brazil by Fernando Fontana.

➢ Defining Criteria for the Distinction of Hydrothermal Alteration Zones Associated with Shallow and Intermediate Crustal Levels in the Carajás IOCG Southern Copper Belt by Angela Isaura Santos Costa.

Pictures from the Oral Presentations at the Santiago, Chile SEG 2019 by members of our Student Chapter SEG USP. A. Angela Isaura. B. Fernando Fontana. C. Maira Antunes.

The Poster Session participants:

➢ The Cu-Au Furnas Deposit Metallogeny and Ore Typology, Carajás Province, Pará, Brazil by Maira Alves, Aghata Zarelli Viana and Lena Virginia Monteiro.

➢ Comparison of Hydrothermal Alteration Zones and Copper-Gold Mineralization Between in the NW and SE Sectors of the Furnas Deposit, Carajás Mineral Province by Aghata Zarelli Viana, Lena Virgínia Monteiro e Maira Antunes Alves.

➢ Magmatic Textures and Hydrothermal Alteration Assemblages of the

Pictures from the Poster Section at the Santiago, Chile SEG 2019 by members of our Student Chapter SEG USP. A. Bruna de Freitas. B. Maira Antunes. C. Aghata Zarelli.

One of our committee member was able to take our Student Chapter SEG USP to Vancouver, Canada, from January 20th to 23rd, to attend the British Columbia Annual Mining Conference, and another poster was presented by our President during the AME RoundUp Vancouver 2020:

➢ Exploratory Potential of the volcanic rocks of the Tapajós Mineral Province (ca. 2.1 Ga 1.87 Ga) by Bruna de Freitas and Caetano Julianni.
Picture from one of our members, Bruna de Freitas, attending the Poster Section, RoundUp Vancouver, Canada 2020.

**e. Courses Attended by the Members**

Whenever it was possible, our SEG Student Chapter USP tried to participate in courses offered to students related to the field of economic geology, metallogenesis, and softwares, applications intensively used in the mining area, aiming to disseminate knowledge and promote our group in other universities and with companies in the mineral sector.

- **“FT02 - Porphyry-Epithermal Ore Deposits of Northern Chile”**

  Between October 29th and 04th, 2019, one of our committee members, Bruna de Freitas, our President, had the opportunity to visit 4 different porphyry systems (within the districts of Chuquicamata and Centinelano) in northern Chile accompanied by the amazing Professor William Chavez. A Field Trip organized by SEG 2019 Santiago Chile to analyze the classic supergenic enrichments of copper, porphyry-copper-gold, and high sulfidation porphyry systems, having access to drill holes to add even more knowledge.
Pictures from our member, Bruna de Freitas, attending the field trip Porphyry-Epithermal Ore Deposits of Northern Chile accompanied by Professor William Chavez. A. Antucoya Deposit in Calama. B. El Abra porphyry Cu-Mo system. C. Chuquicamata Cu-Mo porphyry system. D. Centinela Cu-Mo porphyry system.

- "FT07 - Andean IOCG Deposits in the Atacama Region"

From 11th to 15th October 2019, two of the members of our Student Chapter USP, Bruna de Freitas and Maira Antunes, had the opportunity to review the main IOCG and IOA deposits and the main aspects of the metallogeny of the Atacama region, with visits to the locations of the districts of La Candelaria, Mantoverde, Santo Domingo and Punta del Cobre. A Field Trip organized by SEG 2019 Santiago Chile, the participants were able to review drill holes from each location and visit the Carola and Candelaria mines.
Pictures from our members, Bruna de Freitas and Maira Antunes, attending the field trip Andean IOCG Deposits in the Atacama Region accompanied by Irene Del Real. A. Mantoverde Deposit. B. Candelaria Deposit. C. Ojos del Salado Deposit. D. Carola, the underground mine.

- **KLS SC46 "Volcanology for Exploration Geologists" With Dr. Jocelyn McPhie**

  One of our members, Bruna de Freitas, was able to participate in the "Volcanology for Exploration Geologists" course in Vancouver, Canada on January 18th, 2020. A course aimed at developing the knowledge and skills needed to explore, mine or research in volcanic terrain, taught by Dr. Jocelyn McPhie, current professor at the University of Tasmania and a world leader in the application of volcanology for the exploration of mineral deposits.
Pictures from our member, Bruna de Freitas, attending the Volcanology for Exploration Geologists with Dr. Jocelyn McPhie in Vancouver.

- **Drone and Geo 7.0 Course**

  In the first week of June 2020, Drone Valk company in partnership with the Student Chapter SEG USP made the online course material (20 hours) available to two members, Luigi Carboni and Bruna de Freitas. The course covers everything from pre-field operations, flight planning of your drone to data processing in QGIS. The course also discusses how to set up a map with the information obtained and how it can be applied for Mineral Deposit Modeling.

Picture from the online course Drone and Geo 7.0 taught by Drone Valk discussing image processing.
● **Dam Safety: Technical and Legal Aspects**

A short course taught by the Minere Institute from June 15th to 17th, with a 12 hours workload was attended by one of our members, Rodrigo Okasaki, to understand and have a better concept about safety in mining dams.

● **Fundamentals and Principles of Mining Law and Comparative Mining Law**

Extension course attended by Rodrigo Okasaki during June month, taught by CEDIN university with a duration of 10 hours. The course aims to disseminate knowledge of mining law and promote the qualification of professionals who work, directly or indirectly, in the mining sector.

● **Datamine Webinars**

Throughout the months of April, May, and June, during the quarantine time, several online training and webinars were offered by the software company Datamine. Whenever possible, our members participated in these online events to further empower the skills of the new softwares tools. The webinars attended by our members were:

➢ Geological modeling with Studio RM on April 3rd.
➢ Studio RM - Drillhole Planning on May 13th.
➢ Probing Tools at Datamine Discovery on May 15th.
➢ Implicit vein shaping on May 19th.
➢ Studio RM - Statistical analysis of the samples on June 2nd.
➢ Methods of viewing drill holes on June 16th.
➢ Studio RM - Geotechnical modeling techniques on June 30th.

Such opportunity was appreciated by our members, a commitment developed by the Datamine company, supporting the community, and providing resources for all to continue their professional development, even from home.

● **Seequent Webinars**

Like Datamine, the Seequent software company also provided a series of online training and webinars for all professionals in the field. Opportunities that were also attended by several members of our Student Chapter during the months of April, May, and June. The webinars attended by our members were:

➢ Short Term Modeling on April 29th.
➢ Industry best practices for working with Oasis montaj on May 12th.
➢ Planning and processing of magnetic data acquired with drones on May 13.
➢ From data capture to the generation of a geological model on May 21st.
➢ Geophysics for Geologists on May 27th.
➢ Getting started with Leapfrog Edge - Estimating resources from a solid geological base on June 24th.

f. Activities by other Student Chapters

Many events hosted by other student chapters through Brazil were attended by our members. Our group considers such opportunities as a good chance for exchanging ideas, material, and knowledge. Among these events are meetings and lives.

• Lives

During the COVID-19 pandemic, not only other SEG Student Chapters but also many media pages developed new methods of teaching and ideas online. One of these new methods was the dissemination of lives. Some lives could be attended by our members, they were:

➢ Unicamp SEG Student Chapter - Coffee and ore:
  o # 1 - Study and search in quarantine on April 10th.
  o # 4 - The post-pandemic mining sector: overview and future perspectives on May 3rd.
  o # 5 - Junior geologists and mineral exploration: challenges of the beginning of the career on May 7th.
  o # 6 - Drill holes applied to mineral research on May 14th.
  o # 8 - Magmatic Fertility in Porphyry Systems and Implications for Exploration on May 28th.
  o # 9 - Structurally controlled gold mineralization on June 4th.

➢ UNESP SEG Student Chapter
  o "Hydrogeology in Mining" on May 17th.
  o "Geometallurgy: the interface between geology, mine planning and ore processing" on June 17th.

➢ UFPR SEG Student Chapter
“Platinum-Group Element Controls in the Serra Geral” on June 3rd.

Our members from Student Chapter SEG USP appreciate the other chapters' lives initiative, we believe it is a new way to reach a large number of people and we encourage this new practice.

- **Iberoamerican Virtual Meeting of Student Chapters of the SEG**

The SEG Student Chapter UNLP had the initiative to stimulate the virtual meeting of all Student Chapters in South America and Spain in times of pandemic. During the meeting, the formation and history of each group, the activities developed, the events we usually participate in, and the problems faced by each Student Chapter were discussed. The COVID-19 Pandemic was also one of the topics developed, indicating each difficulty that the groups went through. The event took place on May 29 2020, and was aimed at establishing ties between all Chapters.

*Pictures from the Iberoamerican Virtual Meeting of Student Chapters of the SEG and our presentation made by two members, Bruna de Freitas and Lucio Massari. A. Event promotion poster. B. Online Student Chapters participants C. Presentation from our Student Chapter SEG USP.*
g. Field Trip

Our Student Chapter organized one field trip:

i. Visit to the Curaçá River Valley and the chromiferous districts of Bahia State, Brazil: Cu and Cr production associated with mafic-ultramafic complexes

However, with the evolution of the COVID-19 pandemic, unfortunately, our 2020 field trip had to be postponed. The trip is scheduled for next year between the months of May and June, but still without concrete confirmation. The field trip will be possible due to the Stewart R. Wallace Funding that counted for 70% of our costs. We will be a group of seven people, six students, and Professor Lena Monteiro. The field trip is planned to last six days. We are expecting to visit the Caraíba The Ipueira and Coitezeiro Mines, all situated in the Curaçá River Valley, in the Northeast Region of Brazil. The Caraíba Mine exploits mostly chalcopyrite (~70%) and bornite (~30%) from an N-S trend of pyroxenites, norites and enclosing rocks in a “mushroom shape” with cubanite, covellite, pyrite, pentlandite, and pyrrhotite associated. The Ipueira and Coitezeiro Mines are a Chromiferous District with N-S mafic-ultramafic rocks mineralized that contains 5 to 8 meters thick highly massive chromitite layers intruded in the TTG gneisses with ore grades around 38 percent Cr₂O₃.

h. Virtual Projects

With the Covid-19 Pandemic at the beginning of the year 2020, our Student Chapter was forced to adapt to the new lifestyle during the quarantine. As many of our activities were in person, and one of our goals was to bring more courses and knowledge of the mining area to students at our university, we decided to develop other online teaching projects, which can be visited on our page (https://www.scsegusp.com/projetos). Based on some ideas, we were able to develop projects such as Commodity of the Week, Curiosities of the Mining World, Mini-Mining Course about the different Mining Methods, News Blog, and daily publications about Calendar Special Mining Dates.

- **Commodity of the Week**

    Commodities of the Week is one of the projects build by our Student Chapter that can be found online by the #commodityinfo. We decided to bring information about different commodities every week, being published daily on our Facebook and Instagram.
profiles, with easy and quick tests in our stories for students to reinforce the learning. Each week, the chosen commodity is published, and the schedule for the commodity is:

➢ **Mondays:** Discussions about the commodity’s history, as the origin of the name, year of discovery, as well as location and the first application. Information about the physical-chemical characteristics of the commodity is also discussed, as well as the abundance in the earth’s crust.

➢ **Tuesdays:** Discussions focused on the main current uses of the commodity.

➢ **Wednesdays:** Presentation of the main ore minerals and gangue minerals associated with that commodity, with very illustrative images of each mineral group.

➢ **Thursdays:** The central theme of the day is focused on the types of deposits in which that commodity can occur, in which geological environments and what is the genesis of the main world deposits with that commodity.

➢ **Fridays:** The day is geared towards a more economic discussion, where the main producing, exporting, and importing countries of the commodity on a global scale are presented. Also, it is presented how Brazil participates in the production of that mineral commodity, discussing the possible national reserves and exploration in Brazilian territory.

On Saturdays, the content of the Commodity of the Week is added to our website on our teaching page, so our students and professionals can consult at any time in a quick and practical way.
Examples of images already published on our website page about our commodities of the week. Exemples: Nickel, Iron, Chromium, and Manganese. All published during May and June.

- **Curiosities about mining**

  All over the world, countries, cities, and neighborhoods are developed and built by a range of products from mining. For centuries, we have used mining techniques as a basis for introducing entire civilizations into great and new eras. In addition to homes and cell phones, the mining world is present in our daily lives even in medicine and food. In this way, our Curiosity Project about mining started with the publication in our pages about the items from this sector, in addition to fun facts about the mineral industry.

  Some of the topics covered were:

  ➢ Mining for football stadiums
  ➢ Mining present in photography
  ➢ Mining present at Carnival (the most celebrated party of the year in Brazil)
  ➢ What were the first metals in history to be mined
➢ How much each person consumes a year of products from mining
➢ How many minerals are in a single cell phone

The goal is to publicize the mineral sector and show to all students and followers how mining is present in our daily lives.

● Mining Methods Teaching

In the Mini Course of Mining Methods Project, with a material provided by our Academic Adviser, Caetano Juliani, we decided to publish insights about this area of economic geology and mining engineering. A short, practical, and easy to understand content was made available on all of our online pages, discussing the most different methods of mining. The content provided was:

The 4 different types of open-pit mining (open pit, strip mining, terrace mining, and dredging), underground mining, and solution (or dissolution) mining. For each mining method, the cost, the safety level, and the environmental impact that each present were discussed. In addition, it was also approached in which geological situations each method is most effective with the best cost-benefit, and for each type of mining, the main operations cycle was presented.

This content is available on our website for consultation, so students have quick and easy access to the summarized material.

● News Blog

On our website, we have developed a new page that contains the latest news about the mining world. The content is added weekly with the disclosure on our pages, including LinkedIn, where we want everyone informed about the latest news from the mineral sector for free. In times of a pandemic, we believe and defend the news dissemination of how the sector is dealing with and developing new tools to overcome and encourage future professionals. Everyone can access the latest news on the “News Blog” tab on our website.

Weekly we release the news that got more access to our website to show what is the main interest of the population and companies at that time of the month.
Blog promotion poster announcing the new project of our Student Chapter SEG USP with the last news available for free weekly on our website page.

- **Calendar Special Day**

Our Calendar Special Day project features daily publications on important dates and their association with the mining world. Days of national and international celebrations are posted on our pages, bringing a little information about the date and the mineral sector that involves the special celebration. The objective was to support different practices to these days that were not celebrated in normal times and bring a little about how mining can be present on common days.

Dates where we had good repercussions for our material were:
March 10 - Telephone Day  Publications showing how modern cell phones are small deposits of precious metals.

March 22 - World Water Day  Publication encourages awareness on the use of this unique material on our planet.

March 28 - Earth Hour  Student Chapter USP applied to join the movement to turn off the lights to show our concern and support for the environment by turning off our lights for 1 hour.

April 9 - National Steel Day  Publication about the history of the national steel sector, which today is one of the most important in the country.

April 12 - Easter Day  We posted some curiosities about Easter that have connections with geology, talking about the geology of Easter Island and about Rabbit Ears Peak.

April 22 - Earth Day  We published awareness messages to encourage people to build a better world and the Student Chapter USP did a nice attitude of planting a tree on this day to symbolize our concern for the planet.

May 13 - Car Day  Publications discussing what are the most commonly used mineral commodities to build a car.

May 17 - International Recycling Day  Publications to stimulate reflection on the importance of recycling and which metals are most recycled in Brazil.

June 15 - World Wind Day  Publications about the green wind energy production and which are the main commodities needed for the construction and maintenance of the world wind energy parks.

June 30 - International Asteroid Day  Publications about asteroid mining, a subject that is currently in discussion in several countries, under the topic "space race".

July 6 - Air Traffic Control Day  We posted some curiosities about which metals are essential for the construction of airplanes and aircrafts.

August 9 - International Day of the World's Indigenous Peoples  We publish awareness messages to encourage greater protection for indigenous peoples in our country and around the world.

August 12 - National Art Day  Discussions on how mining is present in decorative items, painting, photographs, and how it evolved over the years.

August 19 - World Photography Day  Discussions on how mining is present in photographic films.

August 29 - Gamer Day  Publications about how mining is present in video games and remote controls for a fun time.

September 22 - World Car Free Day  Publications about how mining can be present even during a free car day, using bicycles.

i. Giveaways

To promote the integration between our Student Chapter USP and the students, throughout this management, we reinforced the idea of encouraging and helping students to always participate in our activities. In this way, knowing about some financial conditions
of students in our institute, we carried out a series of raffles with the most varied prizes, and we also used this form as a way of publicizing our group.

The first draw was held on October 28, 2019, on our page, where two prizes were drawn. The winners received 1 ticket from our workshop entitled Prof. Reiner Neuman "Mineralogical and technological characterization of ore: techniques and applications" each.

Other drawings were held during the week of the SC SEG USP Workshop, such as the drawing of a Rite in the Rain, acquired by our Student Chapter USP for the drawing of the geological field book. We also raffled off 7 books donated to Student Chapter USP by Erasto Boretti, the writer of “Discovery of Carajás”, to students participating in the event.

The draw in which we obtained the highest return occurred at the end of May 2020. On May 30 (the geologist's day in Brazil in honor of the law that regulated the profession in the country), we offer a way to celebrate even from far. Through a partnership with the company Geologia BR, we were able to raffle off coupons at the online Geologia BR store. In addition, to support the new students of the 2020 geology undergraduate course, totally affected by the pandemic situation, where the entire course was redesigned and now with new difficulties imposed on these students, we decided to demonstrate our support by reserving 1 of the 3 specially selected coupons to a freshman student who participated in the draw. Another 2 coupons were drawn among all participants in the program.

Away from these draws, our group managed to quadruple the number of subscribers in different channels, obtaining greater participation and visibility of our Student Chapter USP in different regions of the country and the world.

4. Fundraising

In order to optimize the budget to our Student Chapter USP, we developed different ways to bring income for our group. We believe the availability of fundraising is essential to create and develop all our projects for events, giveaways, and courses. Throughout this year we obtained monetary assistance mainly from the Society of Economic Geologists, but in addition, we received good financial support from companies after the reinforce of some partnerships stabilized by our chapter.
a. Partnership with Industry

This year we continued the partnership with the company Geokrikagem and started a cooperation with Geoansata, which gives exemptions and discounts on their courses for SC USP members. We keep our partnership with the company Nexa Resources that provides us professionals with lectures. In addition, other new partnerships were built with different companies, and we recognize very well such support provided by mining companies, which is essential and optimizes the proximity academy-industry. The main partnership made during this management was:

- **Rio Tinto**

  The partnership formed between Rio Tinto Company and Student Chapter USP was during the SEG USP Workshop, where the company was the main sponsor of the event. The company offered U$1,000 for our Chapter to make the event. Without this support, our event would not have happened. With this budget, we were able to bring all the speakers who lived outside our city and guarantee their stay in São Paulo. In addition, the funds were used to purchase food and drinks for the coffee breaks that took place during the 3-day event. At the end of the event, gifts were distributed to the invited speakers who participated in our event. It was a fun way that our Student Chapter managed to signal and demonstrate our admiration and our appreciation for all the present speakers at our event. The gifts were also purchased through the funds provided by Rio Tinto.

- **MGA**

  The partnership formed between the MGA Company was also carried out during the SEG USP Workshop event, where the company's contribution was to assist in the purchase of items needed for the event such as notepad, pens, folders, badges, printed schedules, and as a gift to the participants, a portable necklace cord to support magnifiers glass. The company also provided the Student Chapter with funds for printed advertising leaflets and banners used throughout the event.

- **Drone Valk**

  The partnership developed between Drone Valk and the Student Chapter SEG USP began during the offering of the drone short course in our Economic Geology Workshop in November 2019. We contacted the company specialized in geoprocessing services of images acquired with drones aimed at also for the mineral sector, and this partnership has
only grown since then. The partnership is developed through the availability of online courses for members and with the guarantee of exclusive spots for the Student Chapter SEG USP in courses developed by the company. We also count on the participation of active members in communication groups with Drone Valk for any doubts and suggestions. We are very grateful and honored with this partnership, as we believe that the return of all these courses and the availability of company employees for students will be immensely enriching in their professional careers.

- **Geologia BR**

  The partnership formed between Student Chapter SEG USP and Geologia BR also started in our first workshop in 2019. Geologia BR is a company that sells products and equipment for geologists for field activities (outdoor). During our event, we entered into a partnership where the company could set up stands to sell the products with discounts to event participants during break times for lectures and courses. The partnership also happened this year, when the Student Chapter SEG USP had the initiative to make the geologist's day during the quarantine a special date. The partnership was developed through the availability of discount coupons in the online store of Geologia BR for a draw on our Instagram page for our followers. It was a different way of celebrating the date that was so important for everyone even from a distance, both for professionals and for students affected economically by the pandemic. We are very grateful for the partnership formed with Geologia BR since the company was founded by a graduated student from our university and we believe that the partnership between companies with essential product lines for the professional performance of a geologist and the Student Chapter SEG USP has great benefits of purchasing good quality products at an affordable price to students.

b. **Selling Products**

  Another method used by our Student Chapter SEG USP was to raise money for our first workshop and for funds from through the sale of souvenir products such as pendants, hand samples of minerals, key chains, decorative pieces rocks, and also by selling t-shirts from our Student Chapter SEG USP. One of our biggest good sales was during the SEG 2019 event at Santiago, Chile, where members of our chapter got a space to set up a “Shop Window” of the materials for sale with the event organizing team. The entire collection brought from São Paulo city to Santiago by our group was sold with great success. In this way, the Student Chapter SEG USP managed to develop the workshop
and other face-to-face activities at the end of 2019 and the beginning of 2020 with the financial support collected during the sales of our collection of geological products.

We would like to thank Douglas Kirwin, in particular, for his generous action throughout the SEG 2019 event. Some of our students were trying to raise funds for upcoming projects and Doug helped us with a nice collaboration. So, we left here our “Thank you” message from our committee members for the initiative, and thank you for showing us your ideas and always bringing positive and learning attitudes.

Pictures from our selling for fundraising during the SEG 2019 Santiago Chile Event.

5. Future Plans and Ideas

The Student Chapter SEG USP plans on continuing with the presentations and we intend to promote more short-courses for our members when the Pandemic situation gets better. Some ideas for courses are: “An introduction to Leapfrog”, “Processing aerogeophysical data using Oasis Montaj”, “Radiogenic isotopes applied to mineral industry”, taught by teachers from our university and students that applied the softwares already in their thesis or internship.

Another idea is to organize the field trip next year in partnership with Mineração Caraíba. The proposed field trip would be to the company's copper mines located in the state of Bahia. The field trip was already planned and the availability discussed with Caraíba professionals.

In order to get in touch with first year undergraduate students and to promote a
significant interest in economic geology since their entrance, our chapter is planning a field trip directed to freshmen. The idea and its availability are still being discussed by the members and the economic geologists professors.

Another project that is in preparation by three members of our Student Chapter is an ebook about the most important Mineral Commodities. The project is a creation among undergraduate and graduate students, Student Chapter SEG USP and Teachers from Institute at the University of Sao Paulo with the purpose of making available an e-book that discusses the main mineral commodities in the world. In this e-book, separated by chapter for each commodity, the discussion is about the history, main applications, types of deposits and their genesis, main minerals of ore and gangue, and environmental impacts involving the ore mining. Also, the main alternative materials or possible future substitutes for each commodity, the specifications that each element or commodity needs to be economically well evaluated, and the main producing and importing countries are also present, with a brief discussion specifically about the Brazilian production of the commodity. Advanced topics in mineral economics are also presented with discussions about the evolution of the commodity price, demand and future perspectives, and quick outlooks. All themes and topics are very well illustrated with graphs, tables, and figures. All the chapters of the book are in production by now, and we hope this edition can be published at the end of 2020, in order to assist students and professionals in the area on the most important mineral commodities in the world.

Additionally, the executive committee will keep up with the online meetings to exchange ideas, concepts, and organize events. We believe that if we carry on with these activities our goal of spreading the knowledge and advance in the field of economic geology will be achieved.