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The following abstract is for an article that appeared in issue 193 (December 2021) of the *EXPLORE* Newsletter.

"Breathing New Life into Old Assay Data Using Machine Learning Methods"

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Significant under- or over-estimation of assay parameters can occur when incorrect laboratory assay methods are used. The cost of re-analysis can be very high when such errors are repeated over the scale of thousands of samples. Machine learning algorithms offer a low-cost alternative to expensive re-analysis; a small subset of samples can be re-analyzed, and an algorithm trained to 1) recognize relationships between the corrected parameter and other assay parameters in the subset, and 2) estimate corrected values for the larger dataset. Machine learning algorithms were applied to 5,580 bedrock samples from the Touro exploration assay dataset to assess whether (corrected) sulfur values can be predicted from the other assay parameters in the dataset. When Atalaya Mining acquired a majority interest in the Touro project, it inherited multiple legacy assay datasets with noticeable inconsistencies in sulfur assay data. Further investigation revealed that the data were acquired using laboratory assay methods insufficient to digest metamorphosed sulfides (predominantly pyrrhotite). Machine learning algorithms trained on a dataset with correct sulfur data were able to derive a relationship between other assay variables which enabled reproducing the sulfur concentrations with 93% accuracy. Predictive success is largely a function of 1) the number of samples, 2) the number of assay parameters, and 3) material/deposit geochemistry. Multi-element geochemistry can be used to predict many other things using the machine learning approach. The authors and others have used the approach successfully to predict lithology, alteration, material density, long-term environmental behavior, ore grade, metallurgical characteristics, ore vectors and more.

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The full articles can be viewed at: https://www.appliedgeochemists.org/index.php/publications/explore-newsletter.

THE 1st WEBINAR OF THE SPANISH MINERALOGICAL SOCIETY (SEM)

Organized by the Spanish Mineralogical Society (SEM), the first webinar "Discovering the world of ore deposits" was held every Friday at 17:00 from 22 April to 3 June 2022 as an on-line event. This conference tour held by the most prominent early career Spanish geoscientists targeted a non-specialized audience, as well as secondary school teachers and high school and undergraduate students, with a broad interest in the field of geological science, and particular in the world of ore deposits.

The program included five sessions: 1) Mineral Deposits in Current and Future Societal Challenges; 2) Deposits of Critical Metals; 3) Precious Metal and Diamonds Deposits; 4) Base Metal Deposits; and 5) Future Mining. The sessions are available on the SEM's Youtube channel (https://www.youtube.com/channel/UCbEDhZdyA9KichLvTr6P1jg). The given talks were

- **"Mineral deposits: what, how, where, when and why"** by Dr. Lorena Ortega Menor (Universidad Complutense de Madrid)
- **"Minerals for the current and future of the energy transition"** by Dr. Joaquín Antonio Proenza (Universitat de Barcelona)
- **"Chromium: a messenger from the Earth's mantle"** by Dr. José María González Jiménez (Instituto Andaluz de Ciencias de la Tierra)
- **"Germainum, gallium, and indium in the Andes?"** by Dr. Lisard Torró Abad (Pontificial Universidad Católica de Perú)
- **"Rare Earth Elements: the vitamins for the world's engine"** by Dr. Marc Campeny Crego (Museu Natural de Ciències de Barcelona)
- **"What is coltan?"** by Dr. Sandra Amores Casals (Universitat de Barcelona)
- **"Andalusian gold: an active resource from prehistory to the present day"** by Dr. Lola Yesares Ortiz (Universidad Complutense de Madrid)
- **"Where is the silver? Let's look at the volcanoes"** by Dr. Darío Chinchilla Benavides (Instituto Geológico y Minero de España)
- **"Platinum: history, origin, and deposits"** by Dr. Rubén Piña García, (Universidad Complutense de Madrid)
- **"Diamonds"** by Dr. Núria Pujol Solà (Universidad de Granada)
- **"Where does copper come from?"** by Dr. Isaac Corral Calleja (Universitat Autònoma de Barcelona)
- **"Aluminum, nickel, and cobalt in tropical climates"** by Dr. Cristina Villanova de Benavente (Universitat de Barcelona)
- **"Is lithium the new oil?"** by Dr. Teresa Llorens Gonzáles (Instituto Geológico y Minero de España)
- **"Urban mining: reality or legend?"** by Dr. Dídac Navarro Ciurana, University of Barcelona (Universitat de Barcelona; Universitat Autònoma de Barcelona)

Top: (left to right): Lorena Ortega Menor, Joaquín Antonio Proenza, José María González Jiménez, and Lisard Torró Abad. **Middle: (left to right):** Marc Campeny Crego, Sandra Amores Casals, Lola Yesares Ortiz, Darío Chinchilla Benavides, and Rubén Piña García. **Bottom: (left to right):** Núria Pujol Solà, Isaac Corral Calleja, Cristina Villanova de Benavente, Teresa Llorens González, and Dídac Navarro Ciurana.

José María González Jiménez
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