

Sessions for 7th International IP workshop in Lund, Sweden. May 28th – 30th 2024

Session 1: IP for mineral exploration

The workshop session addresses the diverse aspects of measuring and modelling IP responses of metallic particles and ores across the scales. We invite contributions focused on both primary and secondary mineral resources, including mine tailings, urban waste, and slags, as well as artificial samples. The session also aims at exploring the connections between IP parameters and petrophysical properties utilizing both empirical and mechanistic models.

Session 2: Tackling ambiguity: Towards a more reliable interpretation of IP signals

Given the different possible sources of the IP signal, how can the IP method provide meaningful interpretation of subsurface properties and processes? Current challenges include (i) limited understanding of the validity of various petrophysical relations at different scales, (ii) lack of quantitative relations between the time-domain IP response and properties or processes of interest and (iii) lack of integrative modelling tools allowing to quantitatively test different hypotheses. Contributions focusing on coupled models and joint interpretation between e.g. reactive transport predictions and IP monitoring are particularly welcome. Upscaling petrophysical relations, disentangling between different sources of the IP signal and uncertainty quantification are questions of particular interest for the session.

Session 3: Characterization of contaminated subsurface and monitoring of dynamic processes

We welcome contributions on the use of IP for characterizing and monitoring contaminated systems, where contamination is understood in a broad sense, such as synthetic chemicals and toxic metals as well as gas injections, and also includes remediation treatments and leachates. We will also consider contributions that use IP for monitoring other dynamic processes. The session aims to discuss further opportunities for new applications of IP, enhancing our ability to monitor and understand complex systems, to tackle contamination challenges. This includes reflections on the integration of IP with complimentary data necessary for successful characterization and monitoring, including the need for further petrophysical characterization.

Session 4: From field data acquisition and processing to inversion

Instrument properties and acquisition procedures set the limits for the information content of IP field data. Data processing can enhance the recorded data by filtering out various types of noise, within limits set by the data acquisition. Data inversion is then needed to extract geomaterial properties, where estimating the geophysical properties in themselves is

generally not the primary goal but may be used as a proxy. Alternatively, it is possible to invert directly for the desired properties as for instance permeability. The signal-to-noise ratio and contamination of the IP signals by undesirable sources limits what information can be extracted from field data. For example, EM coupling can be a problem that might be addressed by minimising it, by removing it in the signal processing or by including it in the inversion process. The session addresses the opportunities and challenges around enhancing the information that can be extracted from IP field data, covering the entire workflow from acquisition to inversion and new developments in machine learning. We welcome contributions to the fields of instrument developments, data processing algorithms and inversion approaches in a broad perspective, both methodologically and application focused.