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Chemostratigraphy 101: A practical guide to the use of elemental data for characterization and correlation of sedimentary rocks

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Abstract

The acquisition of bulk inorganic elemental data, and subsequent chemostratigraphic characterization and correlation has become routine analyses in sedimentary sequences over the last 10-15 years. This analysis allows detailed information about depositional facies, mineralogy, redox conditions and sediment provenance to be gathered and placed in stratigraphic context. Many oil & gas industry professionals, students and those working in academia and government organizations now have access these types of data. However there is no standard way in which these datasets are interpreted and as such there may be some confusion over best practice when working to develop chemostratigraphic correlations and also when assessing the confidence of a given chemostratigraphic correlation framework.

In this talk the authors aim to briefly discuss the main sources of elemental data and their strengths and weaknesses. However the presentation will focus on how to build an elemental dataset into a robust and viable stratigraphic characterization and correlation. The following subjects will be discussed and illustrated showing a series of case study examples comprising fluvio-deltaic and shore-face sequences from the Alaska North Slope (Alpine Field (Jurassic-Cretaceous) and include discussion of data in both vertical and lateral well bores:

- Determining key elements and element ratios
- Assessing what is a “significant change” in elemental data.
- Graphical characterization of geochemical units.
- The use of statistics in characterization and correlation.
- Linking elemental data to mineralogy

The authors have over 30 years of combined experience working both commercially and academically with elemental datasets and developing chemostratigraphic correlations in many different depositional environments. The goal of this talk would be to give attendees a working knowledge of how inorganic geochemical data is generated, learn typical interpretation techniques and critically evaluate data to produce robust chemostratigraphic interpretations.

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