



Chemical stratigraphy

Chemical stratigraphy is a sediment characterisation and reservoir correlation tool involving the interpretation of inorganic geochemical data. Hierarchical zonations are developed using graphical and statistical techniques based on variations in key elements and ratios. Chemical stratigraphy can be applied to any stratigraphic interval from any geographic location. It has been effectively applied by Ichron on a worldwide basis for many operating companies. Our team consists of MSc and PhD level geologists with previous academic geochemistry experience, together with highly experienced technicians. Projects are conducted by the same people in the office and at wellsite; same people – same kit.

Methodology

Ichron uses X-ray fluorescence (XRF), inductively-coupled plasma optical emission spectrometry (ICP-OES) and inductively-coupled plasma mass spectrometry (ICP-MS). Both, the XRF and ICP methods allow analysis of more than 40 elements in the range from Na-U in the periodic table. Analysis can be performed on wet ditch cuttings, washed and dried ditch cuttings, sidewall cores, conventional cores and outcrop samples, with all preparations undertaken 'in-house' in our purpose-built laboratory. Typically, projects can be based on up to 200 samples per well depending upon interval thickness and the level of resolution required.

Advantages of chemical stratigraphy are:

- **Potential to correlate reservoir sections that are problematic using conventional methods, for example due to depositional setting or thermal degradation/dissolution of palynomorphs/calcareous microfossils**
- **Characterisation of age-equivalent sediment bodies to investigate provenance/transport directions**
- **Capability of delivering high-resolution stratigraphic correlation in all lithologies**
- **Direct implications for provenance, weathering and diagenetic studies**
- **Can be applied to all ages of sediment from the Neogene to the Pre-Cambrian**



Multidisciplinary approach

Although chemical stratigraphy can be applied as a standalone technique, it is at its most powerful when integrated with existing structural, sedimentological and biostratigraphic data. At Ichron we are able to compile and interrogate multi-disciplinary datasets and then articulate our findings in the form of clear and concise technical reports and presentations. Even for standalone chemical stratigraphic studies geological screening of regional data is a standard procedure. The outcome is that all chemical stratigraphy projects have a geological context and are written for geologists.

Wellsite chemical stratigraphy

Ichron provides wellsite chemical stratigraphy services utilising high-specification XRF machines. These machines are capable of being mobilised to any destination globally. Preparation and analysis of individual samples takes only about 45 minutes, thereby providing near 'real-time' data. Our offshore teams of highly experienced chemical stratigraphers and technicians can therefore deliver:

- **Near 'real-time' results to aid with the placement of coring, casing and TD picks**
- **Synthetic gamma ray logs created from elemental data that may be used to complement or substitute LWD in case of failure**
- **Stratigraphic positioning and 'look-ahead tool'**
- **Geo-steering and well trajectory monitoring**
- **Reduction in drilling risk and uncertainty**
- **Ability to operate in any geographical region, onshore or offshore**
- **Fully insured, logistical and operational support**
- **Integrated with Wellsite Biostratigraphy**
- **100% safety record with no LTA's/LTI's**



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