Topic 2. Basics of Sedimentary Geochemistry – 1: Major and Trace Elements

The purpose of this topic is to introduce you to the most important techniques used to evaluate geochemical data for sedimentary rocks. We will review some basic principles including mass balance, partition coefficients, formal definitions of trace elements, intermediate elements and essential structural constituents, residence time and mixing calculations. We will also introduce a very useful way to evaluate major element data using two ternary diagrams, one especially useful for ‘granitic’ systems and the other for ‘basaltic’ systems. Finally, some time will be spent reviewing trace element data for sedimentary rocks, concentrating on the rare earth elements (REE) that are considered especially useful for evaluating the provenance of sedimentary rocks. Here the focus will be on why certain elements are more useful for evaluating sedimentary provenance versus whereas others are more useful for evaluating various sedimentary processes (weathering, sorting, diagenesis, etc.).

The following seven readings are general background or are referred to in the lecture material for this topic and are for your information only – not required reading. The two papers by Hanson and Langmuir are igneous geochemistry modeling papers but are also relevant background for understanding how to model sedimentary systems.

Background Reading


Additional References

