
A Method for Determining the Age of Deposition of Sediments using SHRIMP. A Technology Trial on the Clastic Sequences from the Haima and Huqf Supergroups of Oman

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The radiometric dating of igneous material is a well established technique, with zircon U/Pb derived ages at the forefront of studies applied to both in-situ and transported material. The application to sedimentary sequences is limited to broad, indirect age ranges. Interbedded volcanic tuffs can actually provide relatively accurate 'indirect' ages but such ages are scarce and consequently our correlation and understanding of Oman's oldest rocks are based on limited data.

An emerging methodology using SHRIMP (Sensitive High Resolution Ion Microprobe) directly samples and dates early diagenetic phosphatic cements giving a relatively well constrained approximate age of deposition. One of the most useful earliest diagenetic cements in siliciclastics is xenotime, which forms overgrowths on detrital zircons. Previous studies have suggested that xenotime overgrowths occur in up to 50% of siliciclastics, irrespective of age, grain size or depositional environment.

A trial study on the Haima and Huqf Supergroups has now investigated almost 100 samples from various stratigraphic levels. Subsurface samples have yet to yield sufficiently large overgrowths (over 10µm in size) to allow SHRIMP analysis and further investigation is required to accurately predict good xenotime occurrence in the Omani subsurface. However, a much smaller surface sample set has yielded key data on the age of the Amdeh Formation in North Oman. An age of 445±9 Ma suggests a latest Ordovician age and probable Hasirah Formation equivalence for the upper part of the Amdeh Formation. Such results prompt the need for a major rethink of subsurface to surface correlations e.g. mapping reservoir facies across the basin.
