

## **Managing Big Data From Little Grains: A Circum-Arctic Zircon U-Pb Age Database**

**Michael A. Pointon<sup>1</sup>, Michael Flowerdew<sup>1</sup>, and Stewart Sinclair<sup>1</sup>**

<sup>1</sup>CASP, Cambridge, United Kingdom.

### **ABSTRACT**

The timing and kinematics of the opening of the Amerasia Basin are poorly understood but have significant implications for the geological histories and petroleum systems of sedimentary basins within the circum-Arctic region. This lack of understanding is in part due to the paucity of direct evidence and subsequent overprinting by the High Arctic Large Igneous Province. Uranium-lead detrital zircon geochronology is a well-established tool for reconstructing sedimentary provenance. It can provide insights into the opening of the Amerasia Basin by constraining the pre-rift configuration of Arctic tectonic terranes and sediment transportation pathways. Despite being comparatively remote, a large volume of published U-Pb age data exists from both the onshore and offshore areas of the circum-Arctic region. However, rigorous comparison of these data is far from straightforward. This is because of variations in the treatment and presentation of data used by different studies. Often it is necessary to recalculate these data against a single set of parameters; for example, using the same age system ( $^{206}\text{Pb}/^{238}\text{U}$  versus  $^{207}\text{Pb}/^{206}\text{Pb}$ ) and employing thresholds on analytical precision and U-Pb age discordance. Such recalculation is a laborious endeavour, particularly when substantial volumes of data are involved. In an attempt to elucidate the opening of the Amerasia Basin, a standardised dataset of published zircon U-Pb ages from the circum-Arctic region is being developed as a geographical information system (GIS) database using ArcGIS®. The database serves as both a repository for large volumes of U-Pb age data and as a platform from which to interrogate the dataset. Custom database tools have been developed within ArcGIS® using Microsoft Visual Studio®. These facilitate the searching of the database and visualisation of U-Pb age data, as probability density and cumulative density plots, within the GIS environment. Compilation of such a database is a considerable undertaking. So far we have focused predominantly on compiling zircon U-Pb age data from igneous and metamorphic rocks within the circum-Arctic region, although compilation of detrital zircon U-Pb age data is ongoing. The database presently contains over 2,500 individual samples and more than 60,000 U-Pb zircon analyses. It is anticipated that the database will be available for demonstration during this presentation.