

## 2019 Narrative Progress Report

PRF#: 57500-UR

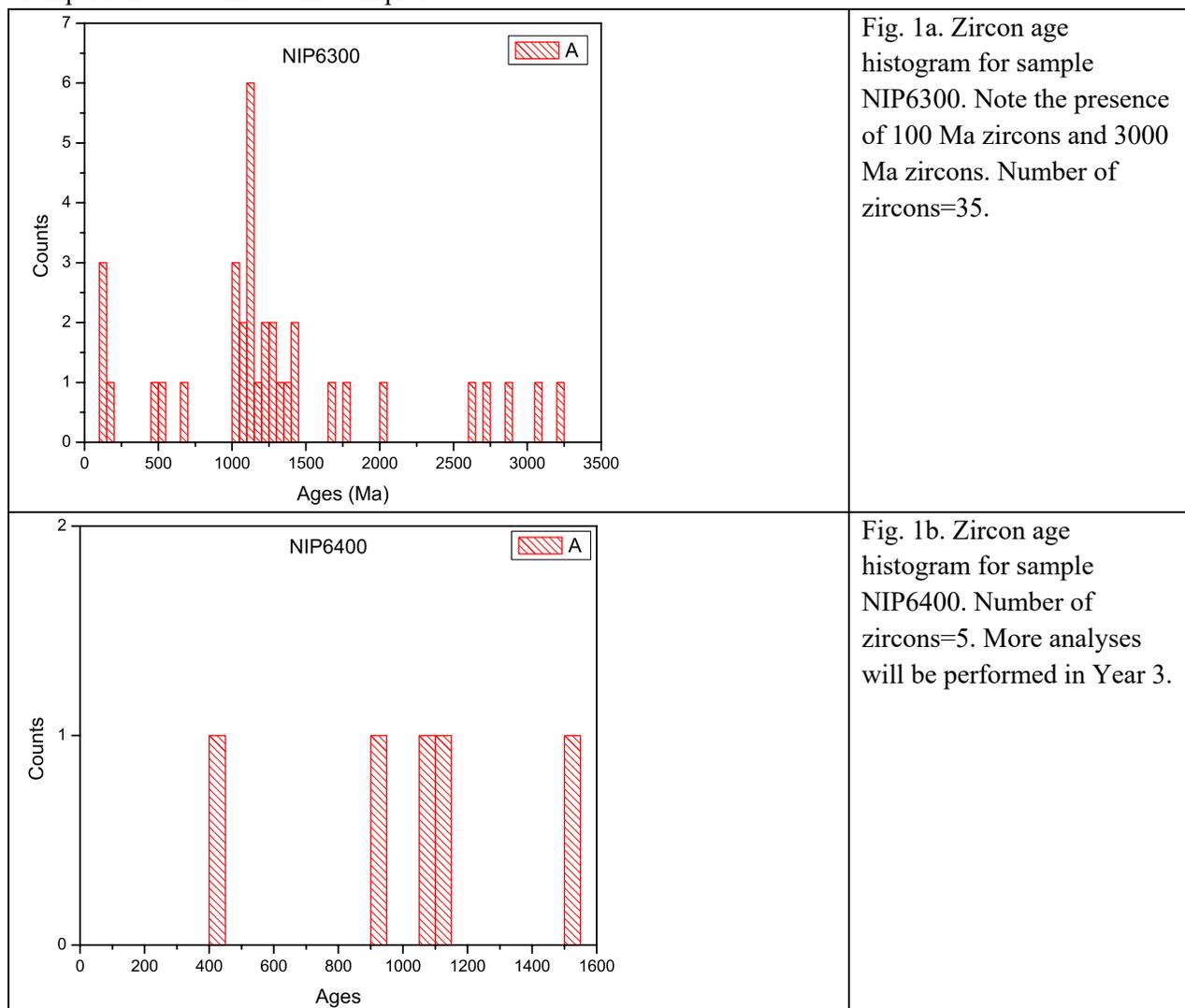
Project Title: Provenance by Petrology and Age-Dating of Zircons: Cretaceous Sandstones of the Arkansas Coastal Plain

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Co-PI name, Affiliation: David King, Department of Geosciences, Auburn University

### 1. The Progress of Research

During Year 2, we analyzed additional 107 zircons from 4 samples of Cretaceous sandstones of Arkansas by U-Pb method using an ion microprobe at the University of California at Los Angeles. The age distributions of new data are given in Fig. 1a, b, c, d. An important outcome of our new work is the discovery of young (100-Ma) zircons in sample NIP6300 (Fig. 1a). Along with the 98 zircon analyses in Year 1, we have a data set of 205 high-quality zircon ages. In Year 3, we will analyze more zircons from sample NIP6400 and 4 other samples.



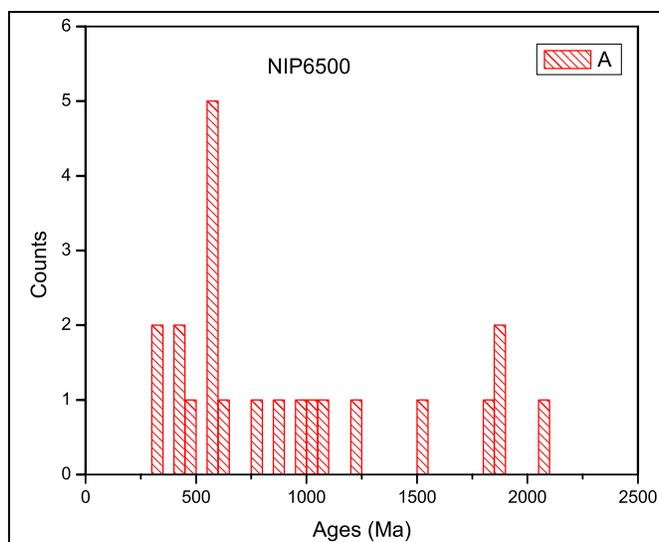


Fig. 1c. Zircon age histogram for sample NIP6500. Number of zircons=23.

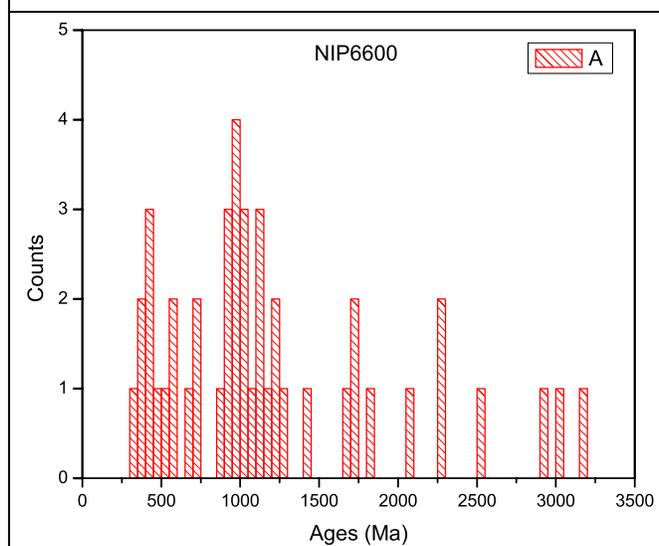


Fig. 1d. Zircon age histogram for sample NIP6600. Number of zircons=44. Note the presence of 3000 Ma zircons.

The youngest detrital zircon ages at 100 Ma provide maximum age of the sandstone. In addition, the 100-Ma zircons indicate their derivations from Cretaceous magmatic rocks from Arkansas. The older (300 Ma to 3000 Ma) age peaks suggest that the zircons of Arkansas Cretaceous sandstones came from both the Appalachian Mountains and the Ouachita Mountains, with contributions from the Oklahoma Basement and the Iapetan synrift. After analyzing more zircons from NIP6400 and 4 more samples, manuscripts for journal publications will be submitted in Year 3.

## 2. Impact of Research on PI's career and that of the students

This research support from ACS-PRF allows PI Zou to change his research direction from igneous rocks to clastic sedimentary rocks, and from igneous zircons to detrital zircons. For co-PI King, this project expands his work on Upper Cretaceous strata in the eastern Gulf coastal plain and the coastal plain of Belize to Arkansas and adjacent areas of the Gulf coastal plain in that region.

The research provides educational training in fundamental petroleum science for two undergraduate students (Mason Woodard and Tori Ferguson) and a Master graduate student (Michael Barrett), and have enhanced their interests and skills for future research in fundamental petroleum fields.