Detrital Zircon U-Pb Geochronology Results for the Bountiful Peak, Coalville, James Peak, Mount Pisgah, Paradise, and Payson Lakes 7.5' Quadrangles, Utah

by

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INTRODUCTION

This Open-File Report makes available raw analytical data from laboratory analysis of U-Pb ages of zircon grains from samples collected during geologic mapping funded by the U.S. Geological Survey (USGS) National Cooperative Geologic Mapping Program (STATEMAP) and the Utah Geological Survey (UGS). The references listed in table 1 provide additional information such as sample location, geologic setting, and interpretation of the samples in the context of the area where they were collected. The data were prepared by the University of Utah Earth Core Facility (Diego Fernandez, Director), under contract to the UGS. These data are highly technical in nature and proper interpretation requires considerable training in the applicable geochronologic techniques.

The analytical data can be accessed electronically as an Excel document attached to the PDF file of this report and available at https://ugspub.nr.utah.gov/publications/open_file_reports/ofr-743/ofr-743.zip.

DISCLAIMER

This open-file release is intended as a data repository for information gathered in support of various UGS projects. The data do not necessarily conform to UGS technical, editorial, or policy standards; this should be considered by an individual or group planning to take action based on the contents of this report. The Utah Department of Natural Resources, Utah Geological Survey, makes no warranty, expressed or implied, regarding the suitability of this product for a particular use. The Utah Department of Natural Resources, Utah Geological Survey, shall not be liable under any circumstances for any direct, indirect, special, incidental, or consequential damages with respect to claims by users of this product. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

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Table 1. *Sample ID and location.*

Sample	Map Unit	Unit Name	Rock Name	Latitude[1] (N)	Longitude[1] (W)	Easting[1]	Northing[1]	7.5-minute Quadrangle
PL2020-112	TKs	Tertiary-Cretaceous strata	sandstone	39.89979	111.72211	438270	4416884	Payson Lakes[2]
P1	Tf?	Fowkes Fm?	tuffaceous claystone	41.58068	111.88863	425925	4603603	Mount Pisgah[3]
P2	Tf?	Fowkes Fm?	tuffaceous sandstone	41.53638	111.87459	427045	4598673	Paradise[3]
P3	Tnf?	Norwood-Fowkes Fms?	tuffaceous sandstone	41.49614	111.81584	431904	4594157	James Peak[3]
ZA-BP-001	Twc	Wasatch Formation	sandstone	40.885324	111.761212	435869	4526305	Bountiful Peak[4]
ZA-BP-003	Twc	Wasatch Formation	sandstone	40.883565	111.762533	435756	4526111	Bountiful Peak[4]
CO-14-DZ	Khen	Henefer Formation	sandstone	40.963301	111.414552	465116	4534765	Coalville[5]
CO-15-DZ	Kel	Echo Formation	sandstone	40.96456	111.420372	464627	4534907	Coalville[5]

Notes:

[1]Coordinate System NAD83, UTM-12
[2]McKean and others, 2021
[3]McDonald and others, 2021
[4]Anderson, 2019
[5]Anderson, 2020

MATERIALS AND METHODS

Sample Crushing and Mineral Separation

Sample preparation was performed at Westminster College and the University of Utah by Taylor McCombs under the guidance of Dr. Tiffany Rivera and Dr. Diego Fernandez. Initial separation included standard crushing, milling, sieving, and washing procedures. Contamination was mitigated through cleaning the machines with bristle brushes, and the grinding plates with a bristle polisher mounted on a drill, along with the use of compressed air. Samples were sieved at 500 µm and stored in clean, labeled containers. The crushed and sieved material < 500 µm was then separated by density using a water table. The densest fraction was processed through a Frantz magnetic separator (~1.0 ampere with a 20° tilt). The non-magnetic fraction was immersed in sodium polytungstate (NaW; $\rho = 2.89$ g/cm^3) and methylene iodide (MEI; $\rho = 3.32$ g/cm^3) heavy liquids. The resulting heavy fraction was then processed through magnetic separation again (1.6–1.8 ampere with a 20° tilt) to purify the mineral separate.

Mineral Mounts and LA-MC-ICP-MS Procedures

Zircon grains were mounted using EpoThin™ epoxy (Buehler, Lake Bluff, Illinois, USA) in a 1-inch-diameter cylindrical mount, and polished using CarbiMet™ silicon carbide grinding paper (Buehler, Lake Bluff, Illinois, USA) to expose the medial sections of each grain. Isotopic values were measured at the University of Utah on a Thermo-Fisher Scientific Neptune Plus multicollector mass spectrometer. Each grain was ablated using a Teledyne-Photon Machines® 193 nm excimer laser with a 24-µm-diameter spot for 30 seconds at 10 Hz. Zircon 91500 (Wiedenbeck and others, 1995, 2004) was employed as the primary reference material and analyzed along with Plesovice zircon (Slama and others, 2008) as a secondary reference after every 10th unknown in a standard-sample bracket. Results from the primary reference material were used to characterize mass bias and laser-induced elemental fractionation which were corrected for using the Iolite v4.3 software package (Patton and others, 2010 and 2011). Instrument precision and accuracy were characterized by the Plesovice zircon standard. IsoplotR (Vermeesch, 2018) was used for selected samples to propagate additional uncertainty (1%–2%) into each analysis as required to make the secondary reference zircon a single population (MSWD = 1) and create concordia diagrams and probability density function plots. No data filtering was performed for the plots included.

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