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Supplemental File. Geochronologic Methods and Data

PRESENTATION

Zircons were separated from all samples by conventional density, size, and magnetic methods. Zircons were mounted in epoxy disks, polished to expose the grain interiors, and imaged using cathodoluminescense. These images were used to guide the analyses by either laser ablation inductively coupled plasma mass spectrometry or secondary ion mass spectrometry (SIMS: SHRIMP–RG, sensitive high resolution ion microprobe–reverse geometry). All ages mentioned in the text are listed in Tables DR1 and DR2, and are reported at the 2σ level in the text. For ages <1000 Ma, ages were calculated from the ratio of $^{206}Pb/^{238}U$, and discordance was based on the difference between the $^{206}Pb/^{238}U$ and $^{207}Pb/^{235}U$ ages. For ages >1000 Ma, ages were calculated from the ratio of $^{207}Pb/^{206}Pb$, and discordance was based on the difference between the $^{207}Pb/^{206}Pb$ and $^{206}Pb/^{238}U$ ages. For data plotted from published reports, the same criteria were applied. All $^{207}Pb/^{206}Pb$ ages reported or utilized in plots are <10% discordant, and $^{206}Pb/^{238}U$ ages are <5% discordant.

Plotting of kernel density estimators (KDE) of the data for detrital zircons from sedimentary rocks used the *density plotter* java script of Vermeesch (2012), who provides further discussion of the utility of KDE plots. Figures 3, 4, and 6 through 10 display KDE plots overlain on data binned in histograms. KDE plots are similar to PDF (probability density function) plots; however, the KDE plots assign error to kernels of data rather than to individual samples to determine the distribution, producing a lesser tendency for low-error data to generate “peaks” in the KDE than in the PDF. The small circles below the *x*-axis in the KDE plots represent the values of each age used in the calculation of the distribution; the diameters of the circles are uniform and not related to the errors of the individual analyses they represent. Variable widths (age ranges) of the histogram bins reflect the sizes of the kernels calculated from the ages and 1σ errors. Plotting of Tera-Wasserburg concordia diagrams for data from igneous rocks shown in Figure 5 used the ISOPLOT program of Ludwig (2008).

Most detrital zircon analyses reported herein were completed at the University of Florida using a 213 nm Nd-YAG laser ablation system coupled to a Nu Plasma multi-collector ICP mass spectrometer. Details of measurement protocols are in Mueller et al. (2008). Detrital zircons from samples 10.LV-LP-1.3, 12.LV-LPL-4, and 17.03–346 were analyzed for U/Pb using a New Wave UP-213 (213nm, Nd:YAG) laser system coupled to a ThermoFinnigan Element2 ICP-MS instrument at Washington State University. The U/Pb analytical routine and data reduction followed Chang et al. (2006). Standards Peixe (564 Ma; Dickinson and Gehrels, 2003), FC-1 (1099 Ma; Paces and Miller, 1993), and R33 (421 Ma; Black et al., 2004; Mattinson, 2010) were used to determine fractionation factors for the $^{206}Pb/^{238}U$ and $^{207}Pb/^{206}Pb$ ratios.

Zircons from two igneous clasts (samples 14.LV-LP-4.3 and 15.LV-LV-2.1) were analyzed at the U.S. Geological Survey–Stanford University SHRIMP-RG (sensitive high resolution ion microprobe–reverse geometry) facility (Table DR2). The U/Pb analytical routine followed Barth and Wooden (2006), and data reduction used Ludwig (2001). Fractionation corrections were calibrated by replicate analysis of the natural zircon standard R33 (421 Ma; Black et al., 2004; Mattinson, 2010), and U concentrations were calibrated with CZ3 (550 ppm U; Pidgeon et al., 1994). Analysis occurred during two separate sessions on two different mounts, with 2σ calibration errors for the R33 $^{206}Pb/^{238}U$ ratios of 0.53% and 0.54%.

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