**SUPPLEMENTARY TEXT**

The potentially adakitic composition of several samples is illustrated by Sr/Y vs. Y and La/YbN vs YbN diagrams (Figure 9). Defant and Drummond (1990) described these criteria for adakitic rocks: SiO2 > 56 wt.%, Al2O3 > 15 wt.%, Y < 18 ppm, Yb < 1.9 ppm, Sr > 400 ppm.

These are the data for potentially adakitic samples from our study:

SiO2 Al2O3 Y Yb Sr

> 56 > 15 < 18 < 1.8 > 400

TC-02 72.28 14.85 9 0.37 457

TC-05 74.38 13.77 7 0.66 583

TC-07 74.27 14.86 5 0.29 1021

TC-22 68.84 13.78 17 1.18 1036

TC-13 70.04 15.49 10 0.73 333

TC-26 67.69 15.20 13 0.87 488

Al2O3 values are low for most samples, compared with the criterion of 15 wt.%, but the other criteria are met by all of the samples except TC-13, with Sr = 333. The occurrence of adakitic compositions is important because it implies (due to the high Sr content) that plagioclase was absent in the source or was completely melted during partial melting; the low Y and Yb content signal that hornblende ± garnet was present in the source, or were crystallized during fractionation of the magma. These constraints indicate that melting was occurring within the lower crust (plagioclase absent at P > ~ 8 kb, about 25 km depth). Rocks with similar features (high Sr/Y and La/Yb, low Y and Yb) occur elsewhere in Pan-African terrains (e.g., Attoh et al., 2013).

**Supplement Figure 1:** Our samples include metaluminous and peraluminous compositions. Other studies of Chad rocks, predominantly from Guéra, tend to show predominantly peraluminous compositions. These data are consistent with the interpretation that the rocks derive predominantly from crustal sources. None of the samples are peralkaline.

**Supplement Figure 2:** The potentially A-type characterization of some of the Chad samples is illustrated on graphs of (a) (Na2O + K2O) / CaO vs. Zr + Nb + Ce + Y, and (b) FeOt / MgO vs. Zr + Nb + Ce + Y (Whalen et al., 1987). FG: fractionated granites; ORG: orogenic granites. There is a scattering of data into the A-type field. Whalen et al. emphasize the importance of elevated Ga content as a discriminator of A-type rocks, but we do not have Ga data for the Chad samples, so that the A-type characterization depends on (Zr + Nb + Ce + Y). Intermediate SiO2 samples TC-06, TC-14, TC-22, and TC-25; granites TC-01, TC-10, TC-11, and TC-15; and high-Si granite TC-09 fall into the A-type fields on Supp. Fig. 2. Ten samples from Shellnutt et al. (2018, 2019, 2020) plot off-scale in (a), at (Na2O+K2O)/CaO > 30; four of these also contain Zr+Nb+Ce+Y > 350 ppm. A-type granites are generally regarded as "anorogenic," but the (Zr + Nb + Ce + Y) criterion also captures "alkaline" granites. Further evaluation of these samples would be needed to determine whether they are truly anorogenic rocks.

Shellnutt et al. (2018), based on Ga data, show that all samples from the Lake Fitri area are A-type, and also plot in the WPG field on the Rb/(Y+Nb) diagram (Supp. Fig. 5a). Curiously, not all of these samples plot in the A-type field in Supp. Fig. 2; the discrepancy reflects the removal, during fractional crystallization of accessory phases, of Zr, Nb, and Ce; Y is exceptionally enriched in many of the Lake Fitri samples.

**Supplement Figure 3:** Concordia diagrams of our zircon U-Pb age results for individual samples.

Our data show three age groups that are independent of bulk-rock compositions. The first, represented by samples TC-09, TC-10, TC-11, TC-17, and TC-19, have crystallization ages from ca. 670 Ma to 1015 Ma. These samples have well-developed foliations that overprint igneous contacts.

*Group 1*

TC-09 (South Ouaddaï): All four zircon grains from TC-09 are discordant, with 207Pb/206Pb ages ranging from 915 to 986 Ma.

TC-10 (South Ouaddaï): Ten zircon grains from this deformed leucogranite yield data that are similar to TC-11 and TC-19, with a maximum crystallization age of approximately 1015 Ma and a minimum of 1005 Ma, and with complexity caused by inheritance and Pb-loss. Most importantly all three samples are ca 1.0 Ga and show evidence of inheritance with a minimum date for the oldest component of 1620 Ma.

TC-11 (South Ouaddaï): Data on eight zircon grains from this tonalitic gneiss cluster near concordia with indication of an older inherited component as shown by a grain with a Pb-Pb date of 1620 Ma. The youngest grain has a 206Pb/238U date of 1004 Ma and is likely the best estimate of the crystallization age. The other grains plot slightly to the right of concordia with Pb-Pb dates that range from 1014.8 to 1025.0 Ma. Two discordant analyses (z1 and z3) show signs of Pb-loss.

TC-17 (North Ouaddaï): Data for eleven zircon grains from this foliated leucogranite produce a complex array that can be interpreted as indicating a maximum crystallization age of ca. 672 Ma with variable inheritance of ca. 1.0 Ga zircons from older gneisses.

TC-19 (North Ouaddaï): Fourteen zircon grains from this mylonitic granodiorite yield a discordant array anchored by several concordant points that indicate a maximum crystallization age of approximately 1015 Ma, although the effects of inheritance and Pb-loss preclude a more precise interpretation.

*Group 2*

Rocks from this group include TC-14, a dark biotite-feldspar augen gneiss, and TC-18, a strongly foliated leucogneiss, from the central migmatite and gneiss terrain near Adré at the border with Sudan. The zircon populations from these two samples suggest Paleoproterozoic crystallization ages, but the zircons are discordant and affected by Pb-loss.

TC-14 (North Ouaddaï): Four zircon grains from this sample yield Pb-Pb dates that range from 1606 Ma to 1726.9 Ma, but discordance prevents a precise estimate of the crystallization age.

TC-18 (North Ouaddaï): Five zircon grains were analysed. Two zircon grains have Pb-Pb dates < 1.0 Ga, similar to Group 1. Three older zircon grains have Pb-Pb dates as old as 2027 Ma (with a 206Pb/238U upper concordia intercept date of 2128.2 Ma) indicating involvement of Paleoproterozoic crust, probably as inherited grains.

*Group 3*

These rocks (TC-01, TC-03, TC-04, TC-06, TC-07, TC-20, TC-21, TC-22, TC-24, and TC-26) are from a widespread suite of porphyritic granite plutons, mostly with large alkali feldspar phenocrysts, that frequently occur as inselbergs throughout Chad, and indeed across most of the Sahara. The zircons in these rocks range from 557 Ma to 623 Ma.

TC-01 (Guéra): Four zircon grains from this undeformed granite, with rapakivi-type textures, show evidence of Pb-loss and inheritance. Three grains define a linear array with an upper intercept of 557.1 anchored by a nearly concordant point with a 206Pb/238U date of 557 Ma. The upper intercept is interpreted as the best estimate of the crystallization age.

TC-03 (Guéra): Data for four zircon grains from this undeformed biotite-hornblende tonalite cluster near concordia, with one analysis showing reverse discordance. The three clustered grains have a weighted mean 206Pb/238U date of 590.67 ± 0.46, which is interpreted as the crystallization age.

TC-04 (Guéra): Five zircon grains from this fine grained granite yield a discordant array anchored by a concordant analysis. The upper intercept date is not statistically meaningful (586.2 ± 2.6; MSWD=5.4) but the most concordant point has 206Pb/238U, 207Pb/235U, and 207Pb/206Pb dates of 584.7, 584.8, and 585.3 Ma, respectively, and we interpret the best estimate of the crystallizations age to be ca. 585 Ma.

TC-06 (North Ouaddaï): Five zircons grains from this sample of the Abéché granite all show evidence for inheritance, plotting to the right of concordia with Pb-Pb dates that range from 614 to 626.5 Ma. One grain is distinctly older and has a Pb-Pb date of 972.4 Ma. A mixing line of all five analyses suggests a crystallization date of ca. 602 Ma and an inherited component of ca. 1010 Ma, the age of the older gneisses described above.

TC-07 (North Ouaddaï): This fine-grained, folded and schistose aplite cuts the foliation in its granitic-gneiss host (similar to TC-11), which also contains an internal schistosity that cuts across the igneous contact and penetrates both rocks. Five grains yielded Pb-Pb dates of: 623, 810, 1054.8, 1877, and 1951.7 Ma. The cross-cutting aplite dike has a maximum crystallization age of the youngest analysis, concordant at 623.5 Ma, and its internal fabric must be younger.

TC-20 (North Ouaddaï): Four zircons from this coarse, undeformed granite were analyzed, three of which cluster near concordia. A discordia fit through the data yields an upper intercept of 596.4 ± 2.9 Ma, consistent with the most concordant point that has 206Pb/238U, 207Pb/235U, and 207Pb/206Pb dates of 595.5, 595.2 , and 594.2 Ma, respectively, and suggest a date of 596.4 Ma as the best estimate of crystallization age. One grain is distinctly older with a Pb-Pb date of 1012.1 Ma, consistent with inheritance from Group 1 gneisses.

TC-21 (North Ouaddaï): Four zircon grains from this undeformed, porphyritic Guereda granite yield a range of dates. The youngest has a 207Pb/206Pb date of 593.9, and the others are 622.1, 834.2, and 1550.9 Ma. The simplest interpretation is that the rock crystallized around 594 Ma with inheritance of variable amounts of Neo- and Mesoproterozoic zircon with a minimum age for the oldest component of ca. 1550 Ma, similar to inherited grains in the Group 1 gneisses.

TC-22 (North Ouaddaï): Three zircon grains were analysed from this dacite sample. This is our only supracrustal rock from an undeformed volcanoclastic sequence intruded by granite. The zircons yield analyses near concordia with a weighted mean that is best interpreted as indicating a crystallization age of ca. 608.5 Ma, with minor inheritance.

TC-24 (North Ouaddaï): Five zircons were analysed from this undeformed gabbro dyke that crosscuts foliated granite. Their Pb-Pb dates range from 606.4 to 613.0 Ma. A unique interpretation is difficult other than the rock likely crystallized around 613 Ma, indicating coeval granitic and gabbroic magmatism.

TC-26 (North Ouaddaï): Nine zircons from this undeformed biotite-granodiorite yield a discordant array with the most concordant analyses indicating a crystallization age of ca. 613 Ma. Some Pb-Pb dates are as old as 634 Ma, consistent with minor amounts of inheritance.

**Supplement Figure 4:** Neither 143Nd/144Ndi nor εNdt correlate with SiO2 content. If there were a significant depleted mantle component in these samples, we would expect low-SiO2 samples to have higher 143Nd/144Nd. Similarly, assuming the more silicic samples reflect exclusively crustal sources, we would expect these to have consistently lower 143Nd/144Nd. These features are not evident in our data, nor in data from southern Ouaddaï (Djerossem et al., 2020) or Guéra (Shellnutt et al., 2019, 2020). The only gabbro for which we have data (TC-24), from north Ouaddaï, has εNdt of -12.3, indicating derivation either from enriched mantle (subcontinental lithospheric mantle – SCLM), or Nd content dominated by crustal contaminants. The more silicic rocks all have εNdt

that is more positive than that of TC-24; if TC-24 were a precursor to the more silicic rocks, then assimilation-fractionation processes would require crust to be less “evolved” than the presumably mantle-derived gabbro. This suggests that SCLM is not a likely source for the silicic rocks in our sampling.

**Supplement Figure 5:**

Our sampling is a reconnaissance sampling in which we did not target what appear to be cogenetic igneous suites, nor did we sample a representative selection of rocks in Guéra and Ouaddaï. We thus have little basis for interpreting potential tectonic settings for our samples. Though tectonic discrimination diagrams are known to have significant uncertainties, plots of the Chad rocks (Supp. Fig. 5a, 5b; Pearce et al., 1984) provide a suggestion of possible tectonic settings. From the deformation of many samples, we know that they have been involved in collisional orogenesis, either during the ~ 1000 Ma magmatic episode, or during the subsequent Pan-African event. The dominant volume of granitic rocks in our field area, however, is undeformed, and likely formed in a post-orogenic setting. The only environment in which granitoid plutons of similar size commonly occur is that of continental arcs, and thus we propose that both the ~ 1000 Ma and some of the ~ 600 Ma rocks formed in a continental arc environment. A number of the post-orogenic rocks, particularly those younger than ~ 590 Ma (mostly described in the literature), are potentially anorogenic, A-type granitoids. In Supp. Figs. 5a and 5b, the fields are VAG: volcanic arc granite; syn-COL G: syn-collisional granites; WPG: within-plate (anorogenic) granites; ORG: oceanic ridge granites. Data from other studies as noted in Fig. 6 of main text. Potentially A-type granitoids plot mostly in the WPG field.