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TO: Jim Johns

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FROM: Manuel Cajuguiran

DATE: March 2, 2004

TOTAL PAGES: 2 (Including cover sheet)

COMMENTS:

Dear Mr. Johns

Attached is the abstract you requested.

If I can be of any further assistance, please don't hesitate to let me know.

Sincerely,

Manuel Cajuguiran

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indicating that the water-to-rock volume ratio (a function of permeability) within the reservoir is high enough to be favorable for geothermal development.

V21C MC: HALL D Tues 0830h
Volcanology II: Geochronology Posters
Presiding: P R Renne, Berkeley Geochronology Center; M R Reid, UCLA

V21C-1 0830h POSTER

$^{40}Ar/^{39}Ar$ and U/Pb SHRIMP Dating of Latest Permian Tephras in the Midland Basin, Texas

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Latest Permian chronostratigraphy is very poorly calibrated due to a paucity of relevant radioisotopic data. Thin (1-20 cm) bentonites interbedded in the Quartermaster Fm. (QMF), which has yielded conodonts of Changxingian (uppermost Permian) age, contain sanidine and zircon in addition to biotite previously dated from one unit by K-Ar at 2514 and 2619 Ma. Single crystal laser fusion Ar-Ar analyses of 40 sanidine grains from each of two bentonites separated by 20 m stratigraphically at Caprock Canyon State Park, Texas, reveal no significantly older grains, indicating that contamination is rare, very subtle, or absent. Excluding a few grains (;10250.7 +/- 0.5 and 250.2 +/- 0.5 Ma (2 s.d.) for the lower and upper bentonites, respectively. In addition, small (10-12 grain) populations of sanidine were incrementally heated using a broad-beam, 10.6 micron wavelength laser. Two age spectra for lower bentonite sanidines yield plateau ages with a mean of 251.2 +/- 0.6 Ma. Age spectra for upper bentonite sanidines, though in one case meeting formal plateau criteria (plateau age = 249.4 +/- 0.7 Ma), rise monotonically through their central portions. This may indicate minor trapped Ar of non-atmospheric composition, which could bias the single crystal ages to older values. SHRIMP ion microprobe ages of rims of volcanic zircons from the same two bentonites yielded mean ages of 2626 Ma and 2563 Ma for the lower and upper units, respectively, with older cores of 1000-1200 Ma and 1380-1430 Ma age. The 40 U/Pb ages, however, scatter more than expected from analytical precision, and define a histogram suggesting a bimodal age distribution with peaks at about 248-250 Ma and 256-260 Ma. The younger component is possibly the age of the tuffs, whereas the older component could represent either sedimentologic or volcanogenic contamination from earlier eruptions: high precision ID-TIMS analyses may resolve the question. Collectively, these data indicate (by correlation with Ar/Ar and SHRIMP dating in China) that the Permian-Triassic boundary may be recorded in the QMF.

respectively. The concordancy of these ages, between petrolog similar lavas, corroborates the inference that the two lavas tap common magma reservoir. Further, it tends to confirm the expec from slow diffusion of U and Th in zircon that Th isotope syste will retain the age of crystallization, even at magmatic tempera For the rhyolites studied, zircon saturation temperatures (795 to 8 are the same as those obtained from coexisting Fe-Ti oxides (809 : indicating that the reservoir from which the lavas were extracted to a temperature of <815°C more than 200 ka ago. The sur consequence of these temperatures is the apparent longevity of solidus conditions in the shallow magma reservoir from which rel small (~1 km^3) volume magmas were extracted. It is likely supersolidus conditions were maintained by the regular influ differentiation of mafic magma, resulting in accumulation of the larger volume of magma (>250 km^3) that, based on seismic data, a to underlie the western moat of the Long Valley caldera.

V21C-3 0830h POSTER

ERUPTION HISTORY OF THE CHANGBEISHAN V CANOES, NE CHINA: CONSTRAINT BY K-AR C-14 DATING AND HISTORICAL RECORDS

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The Changbeishan volcanoes, the most potentially active volcan the Mainland China are composed of a large shield volcano with bers of small monogenetic cones. They consist dominantly of ba and less abundantly trachytic to rhyolitic rocks with the featu intra- plate geochemical affinity. Recent studies on the field, and C-14 datings, historical records and previously age determin indicate the Changbeishan volcanism can be divided into four p eruptions. A commencing eruptive phase between 20 to 15 Ma fo several isolated alkaline basaltic bodies. A long period of volcani escence followed until around 3.5 Ma. Between 3.5 to 1.2 Ma, a amount of tholeiitic lavas, average thickness of several hundre ters covered over 10000 km2, effused quickly from a NE-SW fiss form a large shield volcano. Meanwhile, many monogenetic bi cones erupted pyroclastics and lavas. From 1.2 to 0.10 Ma, act continued and had been restricted to a central vent of shield vo Abundant trachytic to rhyolitic magma exploded and effused f central vent in this period to construct a steep composite con Tienchi Volcano. Monogenetic basaltic cones also continuely er on and around composite volcano. Large ignimbrite-formed eru and caldera occurred at the last 10000 years. The eruption 1000 B.P. produced over 172 km3 in volume of abundant ignim and plinian falls, is probably one of the largest eruptions at th 2000 years in the world. Historical literature recorded the last phreatomagmatic eruptions, 1597, 1668 and 1702 A.D. indicat the Changbeishan volcanoes are still active and potentially er the coming future.