The GSA news website:
http://www.geosociety.org/news/pr/13-42.htm

Geology Tracks Eruptions, Earthquakes, Erosion, Extinctions & More

New Geology articles posted online ahead of print 28 June through 11 July 2013

Bozíteř, Colorado, USA — Twenty-five new articles have been posted online ahead of print on Geology’s website since 28 June. The science covers a gamut of topics, from microbial mats to super-eruptions, sand to monazites, glaciers to sintelmes. All Geology articles go through a rigorous peer-review process prior to print. Geology is the highest rated journal for geoscience for the seventh year in a row, according to a 2012 Thomson Reuter’s survey.

GEOLoGY articles published ahead of print can be accessed online at http://geology.gsapubs.org/content/aggregator. All abstracts are open-access at http://geology.gsapubs.org. Representatives of the media may obtain complimentary GEOLoGY articles by contacting Kea Giles at the address above. Please discuss articles of interest with the authors before publishing stories on their work, and please make reference to GEOLoGY in articles published. Contact Kea Giles for additional information or assistance. Detailed highlights are provided below.

Non-media requests for articles may be directed to GSA Sales and Service, news.service@geosociety.org.

28 JUNE 2013

Tracking the evolution of large-volume silicic magma reservoirs from assembly to supereruption
John-Robert Wolf-Dietrich et al., Earth and Environmental Sciences Department, University of Geneva, 1205 Geneva, Switzerland. First published on 28 June 2013, dx. 10.1130/G34965.1

The most voluminous silicic volcanic eruptions in the geological past were associated with calderas collapse above giant silicic magma reservoirs. The thermal evolution of these sub-caldara magma reservoirs controls the volume of eruptions, magma and eruption style. Here we combine high-precision zircon U-Pb geochronology, trace element analyses of the same minerl glasses, and mass balance modeling of cocrate trace element compositions allowing us to track the thermal and chemical evolution of the Oligocene Fish Canyon Tuff magma reservoir (Colorado, United States) as a function of absolute time. Systematic compositional variations in U-Pb-dated zircons record ~400 thousand years of magma evolution. An early phase of volumetric growth was followed by a period of cooling and crystallization, during which the Fish Canyon magma approached complete solidification. Subsequent resetting, due to undergoing andesite recharge magma, began 171 plus or minus 50 thousand years prior to eruption, and led to the generation of ~5000 cubic kilometers of eruptible crystal-rich (~45 vsico) dacite. Age-equivalent, but compositionally different, zircons in an andesitic scoriae from late-erupted Fish Canyon Tuff is a growth and thermal evolution of the upper-crustal reservoir to a lower-crustal magma processing zone. Our results demonstrate that the combination of high-precision dating and trace element analyses of accessory zircons can reveal invaluable information about the chemical and thermal histories of silicic magmatic systems and provides critical input parameters for fluid dynamic modeling.