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State Key Laboratory of Isotope Geochemistry

学术报告

Magmatic Evolution in Grenada, Lesser Antilles: Sediment Subduction or Assimilation?

报告专家：**Prof. William White (Cornell University, Ithaca, NY USA)**

报告时间：**6 月 20 日（周三）上午 10:00**

报告地点：**综合楼 420 会议室**

Prof. William White's primary research interest is the large-scale chemical evolution and dynamics of the Earth, particularly the origin of mantle plumes and the volcanoes they produced as well as subduction related volcanism. He is a fellow of the Geochemical Society and the American Geophysical Union and an ISI highly cited author. He served as founding editor of the electronic journal Geochemistry, Geophysics, Geosystems (G-cubed) from 1999 to 2005. He has published of 100 scientific papers that have been cited more than 12,000 times (H-index 55). He is also the author of two textbooks, *Geochemistry*, and *Isotope Geochemistry* published by John Wiley and Sons and the editor of *the Encyclopedia of Geochemistry*, to be published by Springer in the summer of 2018.

ABSTRACT: Previous studies identified two distinct magma series on Grenada: the Sr-rich and ankaramitic C-series and olivine-microphyric M-series. Variations in isotope ratios in the C-series had previously been interpreted as resulting from assimilation of sediment within the arc crust. New major- and trace-element and radiogenic-isotope analyses and 40Ar/39Ar ages show that eruption of these two magma series has been interwoven both in time and space over the past 6 million years during which the present volcanic edifice of Grenada has been built, indicating they share a common plumbing system and that Grenada is younger than previously believed. Consistent with earlier studies, our data show that the two series are isotopically distinct in their most mafic examples. Trace elements and isotope ratios of both series are best modelled by addition of slab-derived components predominantly through silicate melts, indicating the slab beneath the Southern Lesser Antilles is at or above its solidus. Addition of hydrous fluids is also required, with the C-series requiring a greater fluid component that the M-series. The subducted sediment contribution is greater in the M-series (≥0.6%) than the C-series (~0.2%) and M-series magmas are generated by larger melt fractions than are the C-series. Geochemical signatures of Grenada lavas result from subducted sediment in mantle sources; any effects of sediment assimilation are minor.