



Sensitive responses of modern coral reefs by 1991 Mount Pinatubo volcanic eruption

Chung-Che Wu (1,2), Chuan-Chou Shen (1,2), Li Lo (3), Kefu Yu (4,5), Ching-Chih Chang (1,6), John Pallister (7), Sheng-Rong Song (8), George S. Burr (2,8)

(1) National Taiwan University, Department of geosciences, Taipei, Taiwan, (2) Research Center for Future Earth, National Taiwan University, Taipei 10617, Taiwan ROC, (3) State Key Laboratory of Isotope Geochemistry, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou 510640, China, (4) Guangxi Key Laboratory on the Study of Coral Reefs in the South China Sea, Coral Reef Research Center of China, School of Marine Sciences, Guangxi University, Nanning 530004, China, (5) South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou 510301, China, (6) Department of Geosciences, University of Arizona, Tucson, Arizona 85721, USA, (7) Volcano Disaster Assistance Program, U.S. Geological Survey Cascades Volcano Observatory, V Vancouver, Washington 99683, USA, (8) Department of Geosciences, National Taiwan University, Taipei 10617, Taiwan ROC

Widespread coral bleaching and mortality has occurred intensively and frequently under global warming conditions since the phenomenon was first documented in the early 1980s. However, abrupt and extensive mortality episodes, such as which occurred in the South China Sea (SCS) in mid-1991, cannot be explained solely on the basis of high summer sea surface temperatures. Here we examine this event in the light of time series rare earth elements, trace element Al/Ca ratios, and micro-domain images from coral samples collected in the SCS region. Results demonstrate that modern coral reefs were strongly imposed by a giant volcanic eruption, the 1991 Mount Pinatubo volcanic eruption. Our findings highlight that contemporary continental near-shore reefs are more susceptible than their open-ocean counterparts.