Cities on Volcanoes 9
November 20-25, 2016
Puerto Varas, Chile
*'Understanding volcanoes and society: the key for risk mitigation'*

# Identifying the locations of future eruptions within large calderas: Campi Flegrei, Southern Italy.

**Danielle Charlton [1, 2], Christopher Kilburn [1], Rosa Sobradelo [1, 2], and Stephen Edwards [1].**

[1]UCL Hazard Centre, Department of Earth Sciences, University College London, London, WC1E 6BT, UK;

[2]Institute for Risk and Disaster Reduction, University College London, London, WC1E 6BT, UK.

Keywords: Larges Calderas, Campi Flegrei, Vent location, Volcanic Hazard, GIS.

Large calderas, with surface areas of 100 km2 or more, are among the most populated active volcanoes on Earth. New vents commonly open at locations across the caldera floor. An important goal for hazard mitigation is to develop reliable methods for evaluating the most likely location for a future eruption. A preferred approach is to analyse statistically the distributions of previous vents. Using the Campi Flegrei caldera in Southern Italy as a test case, we examine the sensitivity of results to starting assumptions, notably the choice of data set for defining preferred vent locations. Since the last episode of caldera collapse 15.6 ka BP, most of Campi Flegrei's intra-caldera eruptions have occurred in three epochs (I, II and III) between 15.0 - 9.5, 8.6 - 8.2, 4.8 - 3.8 ka BP. Studies of future vent locations have assumed that (1) only data from Epoch III are most relevant to modern Campi Flegrei, and (2) all eruptions in a connected sequence repeated eruptions from the same vent can be incorporated. When these assumptions are relaxed the number of vents and nearest-neighbour analyses show that vents from Epochs I and II were distributed within an annulus 3-5 km around modern Pozzuoli, but that, in agreement with previous studies, eruptions occurred preferentially NE-ENE of Pozzuoli in Epoch III. However, when related sequences of eruptions from the same vent are removed, centre data show an even, annular distribution for all three epochs. The results suggest that, instead of a preference for the NE-ENE sector, a new vent is expected to open within the established annular structure around Pozzuoli; that the probability of opening is similar in all locations within the annulus; and that, compared with Epochs I and II, Epoch III was distinguished by a greater number of multiple eruptions from individual vents.