



## **Cities on Volcanoes 8**

### **Living in Harmony with Volcano**

### **Bridging the will of nature to society**

category : Oral

## **79 AD Vesuvius PDC deposits' temperatures inferred from optical analysis on woods charred in-situ in the Villa dei Papiri at Herculaneum (Italy)**

**guido giordano<sup>1</sup>, chiara caricchi<sup>2</sup>, alessandro vona<sup>3</sup>,  
sveva corrado<sup>4</sup>, claudia romano<sup>5</sup>**

**<sup>1</sup>Univ Roma Tre, <sup>2</sup>Univ Roma Tre, <sup>3</sup>Univ Roma Tre, <sup>4</sup>  
Univ Roma Tre, <sup>5</sup>Univ Roma Tre**

**E-mail : [guido.giordano@uniroma3.it](mailto:guido.giordano@uniroma3.it)**

Pyroclastic density currents (PDCs) are very hazardous due to their impact on inhabited regions where they cause devastation and fatalities by exposure to mechanical impact, extreme heat and dusty gas. Estimation of PDC emplacement temperatures is fundamental to constrain numerical models and therefore volcanic hazard assessment. The emplacement temperature of a PDC is influenced by its initial temperature, the size and provenance of its constituents, the cooling during transport, and the rate of sedimentation. For past eruptions, in which no direct measurement of the deposit temperature is possible, PDC emplacement temperatures are calculated using proxies. A recent approach to reconstruct PDCs emplacement temperature includes the determination of degree of charring of preserved wood fragments by optical analysis. In this study we perform this kind of study on wooden beams of the Villa dei Papiri at Herculaneum, that was destroyed by PDCs during the 79 A.D. eruption of Vesuvius. The new temperature data from this study, range between 240 to 370 °C; these values well compare with other temperature data reported in literature (using different proxies) for this eruption. The measured large T variation can be explained by accounting for stratigraphy and interaction with the impacted buildings of the Villa. The study of in situ charred wood allows to constrain the kinetics of the charring process and to evaluate the sensibility of the reflectance proxy in recording PDC deposition features.

**Keywords** : charcoal, PDC temperature, 79 AD Vesuvius, optical analysis