27febbraio 2019 Incontro del Gruppo di lavoro sui BIOFILM

Società dei Naturalisti in Napoli, via mezzocannone 8

Ore 9.30

THE BIOFILM FROM THE ACTIVE HYDROTHERMAL SYSTEM OF PISCIARELLI (CAMPI FLEGREI, VOLCANO, ITALY) AND ISCHIA: A WAY TO STUDY THE ROCK/MINERAL/ MICROBIAL INTERFACE AT ACID SULPHATE ENVIRONMENTS

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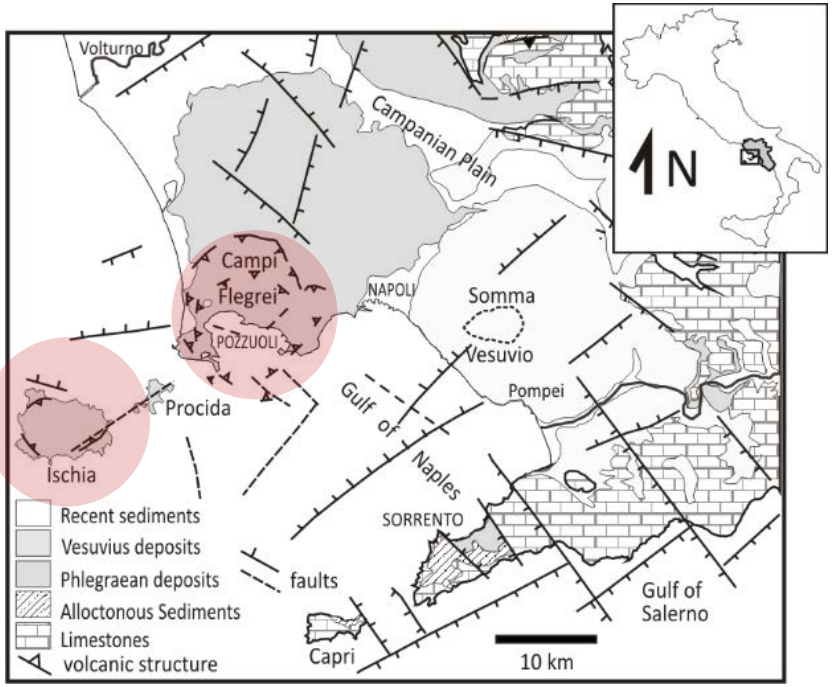
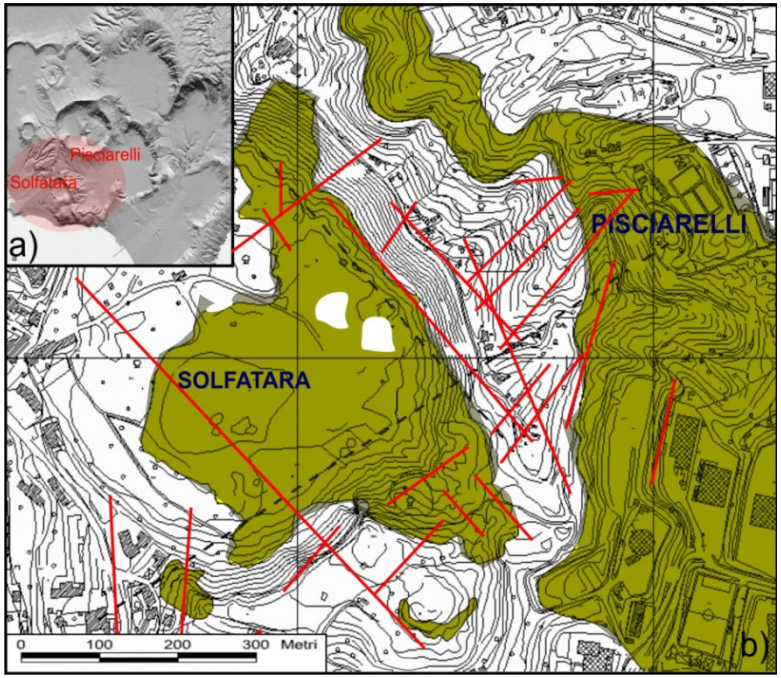
- Department of Biology – University of Sungkyunkwan – South Korea (Hwan Su Yoon)

THE NEAPOLITAN AREA (ITALY) HOSTS TWO ACTIVE HYDROTHERMAL ENVIRONMENTS DEVELOPED IN RELATION WITH THE EVOLUTION OF THE DEEP GEOTHERMAL SYSTEM : THE CAMPI FLEGREI CALDERA AND ISCHIA



Geological map showing the location of volcanic system in the Campanian region (from Piochi et al. 2004)



Distribution of hydrothermal alteration products at the 4 ka Solfatara crater (from Piochi et al. 2015)

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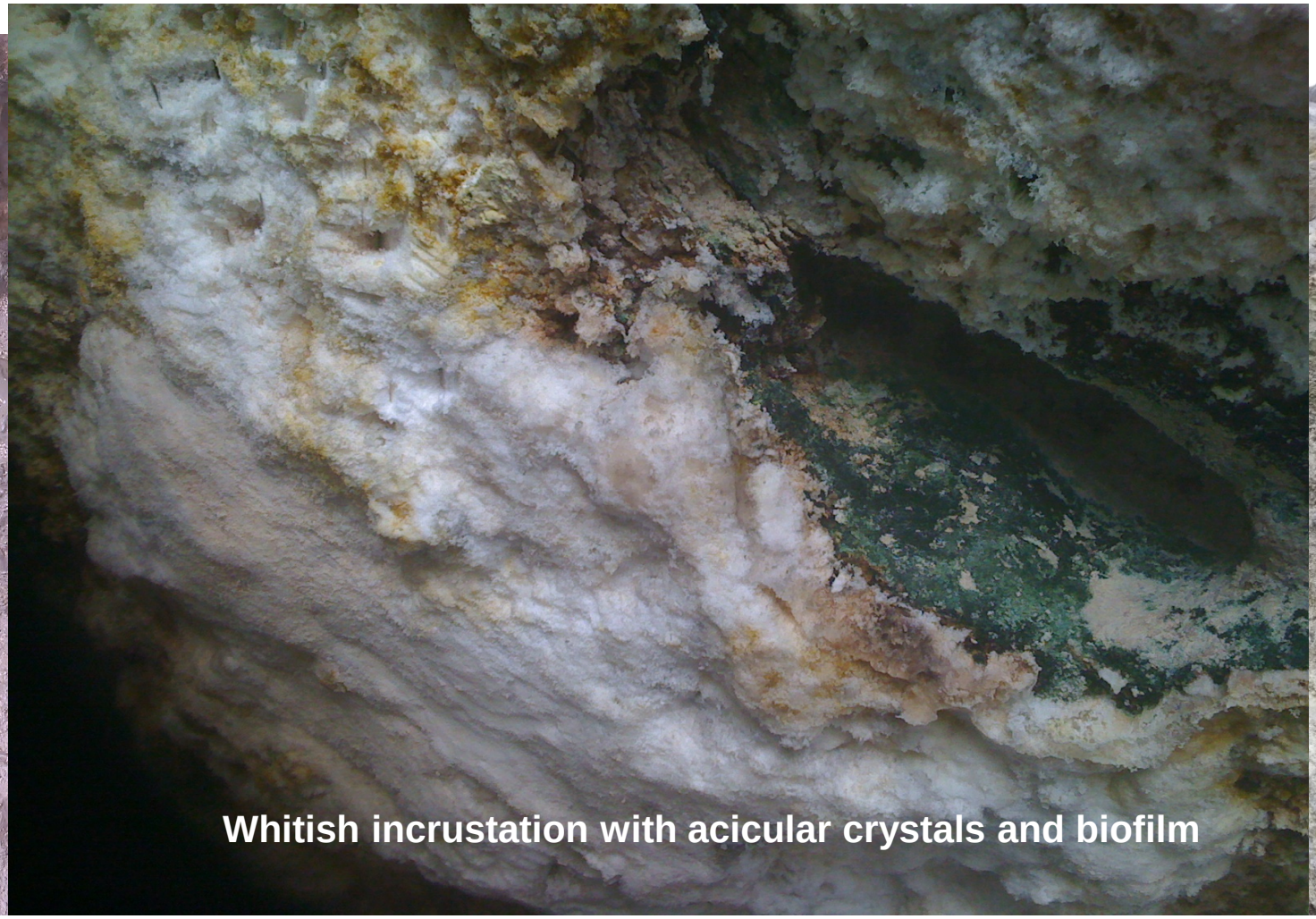
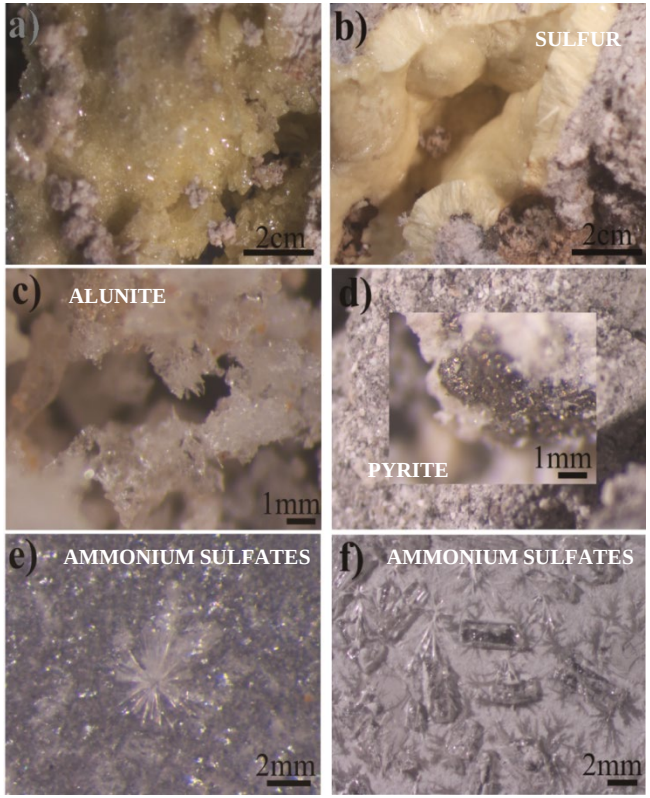
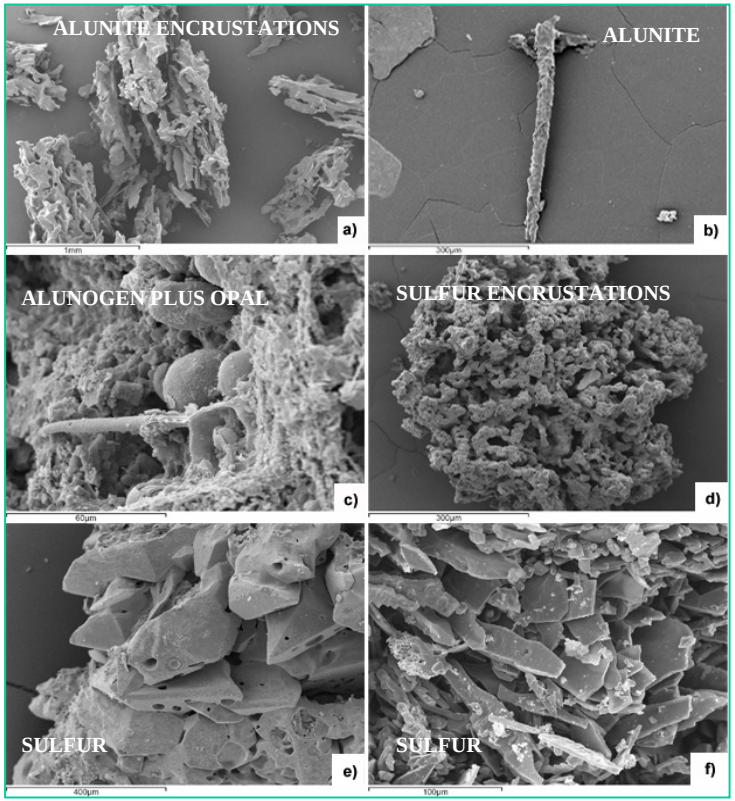
Pisciarelli has geyser activity, gaseous outgassing and boilng pools. Key parameters: T≤ 115°C, pH 1-to 5, CO_2 plus H_2S abundance.



A strict relation can be observed between hydrothemal minerals and the biota.

MINERALOGICAL RESULTS





Hydrothermal alteration minerals are (Piochi et al. 2015) mostly alunite ($KAl_3(SO_4)_2(OH)_6$), alunogen ($Al_2(SO_4)_3\ 17H_2O$), native sulphur, SiO_2, (illite ($(K,H_3O)(Al,Mg,Fe)_2(Si,Al)_4O_{10}[(OH)_2,(H_2O)]$), kaolinite ($Al_2Si_2O_5(OH)_4$), various NH_4-sulfates (ie mascagnite $(NH_4)2SO_4$). Minerals vary locally and in relation with metereological conditions

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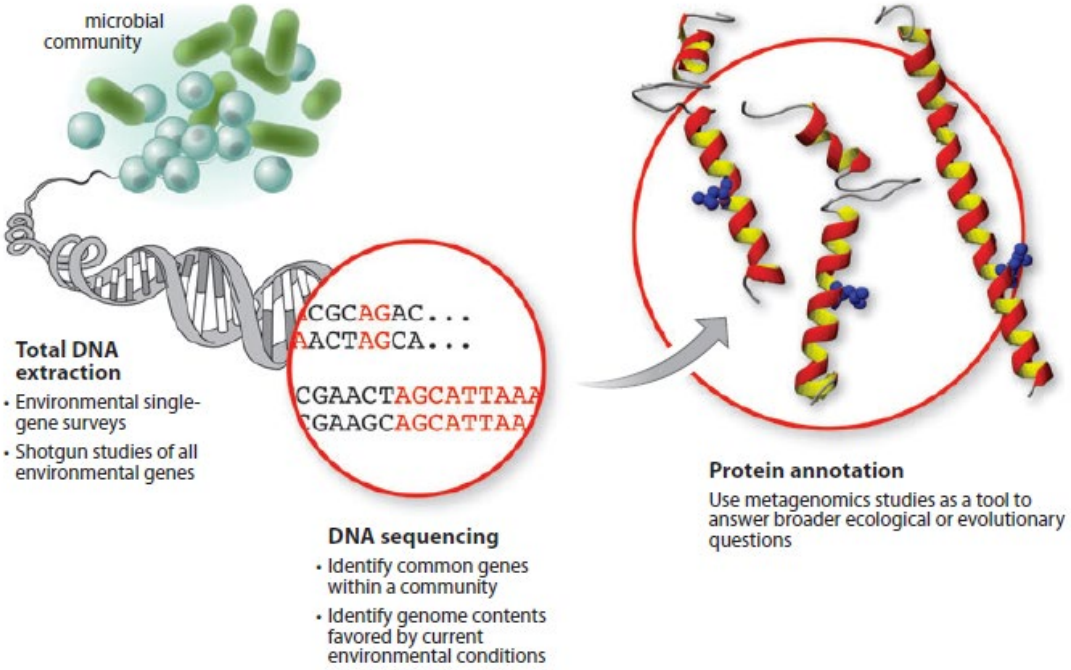
✓ Metagenomic analyses

- **Diversity and abundance of community members ("who is there");**
- **Metabolic potential of the community and its members ("what they are doing");**
- **Ecological relations between members of the community ("why they are there").**



✓ Thermoacidophilic microorganisms as potential tracers of the evolution of the hydrothermal systems

- **Role of the microbial consortium in developing hydrothermal alteration**

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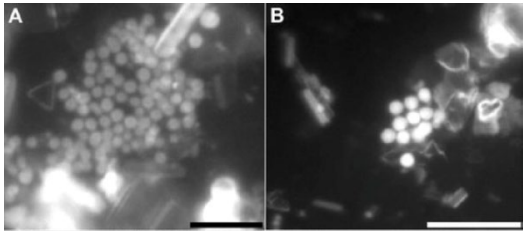

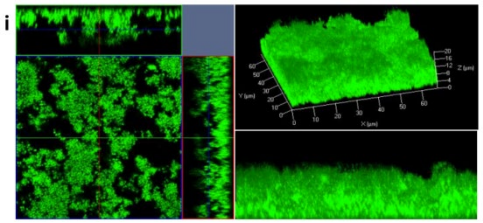

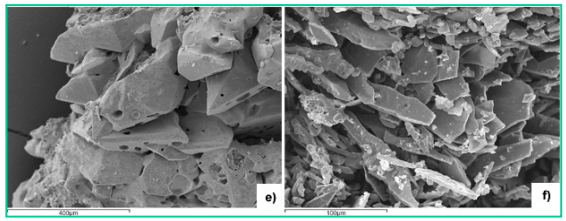

- ❑ *Epifluorescence microscopy*
- ❑ *Scanning electron microscopy*
- ❑ *Confocal laser microscopy*

- ✓ Textural and mineralogical characterization of the substrate

- ✓ Mineralogical analyses in **presence** and **absence** of the biofilm

Risultati auspicabili e implicazioni

- Ricostruzione di ecosistemi e ambienti idrotermali attivi
- Analisi di campioni geologici del passato da individuare in affioramenti e/o carotaggi
- Analisi genetica e mineralogica di livelli selezionati
- Studio delle possibili relazioni tra biota-mineralizzazioni-sistema vulcanico
- Individuazione e caratterizzazione di ambienti idrotermali del passato