#### Automatic detection and location of hydro-acoustic signals linked to Mayotte submarine eruption Jean-Marie Saurel<sup>1</sup>, Lise Retailleau<sup>1,2</sup>, Valérie Ferrazzini<sup>1,2</sup>, Clément Hibert<sup>3</sup>, Themis Palpanas<sup>4</sup> 1 - Institut de physique du globe de Paris (IPGP) 2 - Observatoire volcanologique du Piton de la Fournaise (OVPF) 3 - Institut terre & environnement de Strasbourg (ITES)

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# #Mayotte volcano

#### Motivations

Mayotte exceptionnal submarine eruption is the largest basaltic eruption for its length and volume since the Laki eruption in Iceland in 1784 (Feuillet et al, 2021). While multibeam echo-sounder suveys have been carried out regularly in the area, they only give a snapshot of the activity within a large time-frame, limiting the interpretations of the eruption evolution.

### **Problem statement**

- Systematic analysis of continuous recording
- Very short signal (~0,1s) can easily be mistaken with instrumental noise and glitches
- Numerous earthquakes in the seismic records



Varying number of stations and sample-rate

### **Related Work**

- M1 internship preliminary analysis on a 10 days deployment
- Le Saout et al (2020) analysis reconstructed eruption dynamic at Axial Seamount with hydro-acoustics signals





# **Proposed solution**

- Automatic processing
  - Template matching
- Event localizations
  - Understanding location uncertainties
- Comparison with bathymetric surveys

# Dataset Description

- Between 4 and 16 stations
- 4 channels stations :
  - 3 component short-period geophone

#Hydro-acoustics #Template-matching

## Results

We expect a better understanding of Mayotte eruption dynamic, which should give new insights for the understanding of the activity. So far, those signals are the only remote records that can give clues on ongoing lava flows.

- Hydrophone

62,5, 125 or 250 samples per seconds

MiniSEED format

~3 years of data

References

The method developped during this work could lead the way to real-time lava flow monitoring when, in a few years, permanent cabled OBS will be deployed in Mayotte.

**Feuillet et al, 2021** : Birth of a large volcanic edifice offshore Mayotte via lithosphere-scale dyke intrusion, Nature Geoscience doi: 10,1038/s41561-021-00809-x **Le Saout et al, 2020** : Quantification of Eruption Dynamics on the North Rift at Axial Seamount, Juan de Fuca Ridge, G3 doi : 10,1029/2020GC009136

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