

# NDC-in-a-box analysis of the 17-18 August 2024 Kamchatka seismo-volcanic events: opportunities for integration of the CTBTO IMS system into Kenya's preparedness for concomitant geohazards

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## INTRODUCTION

On the evening of **17<sup>TH</sup> August 2024**, a **mb6.0 earthquake** at a 29 km depth occurred 102 km southeast of Petropavlovsk-Kamchatsky, Russia. The earthquake triggered the eruption of the **Shiveluch volcano** the following day, resulting in a **~8,000-meter ash plume**.

In this study, the author accessed raw event data from the **CTBTO Secure Web Portal SEL2/3 database**, and independently determined the **location and azimuth parameters** of this event using the *NDC-In-a-Box* suite.



Fig 1: mb6.0 event on 17/8/2024



Fig 2: Eruption of Shiveluch on 18/8/2024

## OBJECTIVES

The objectives of this study are:

- To demonstrate the efficacy of the **CTBTO IMS** and **NIAB-suite** in geohazards detection and analysis
- To highlight opportunities for **improving Kenya's geohazards preparedness**



## DATA & METHODS-1a

### a) Waveform Seismic data:

- Collection of waveform seismic data (Signal ID **26607586**) - Secure Web Portal **SEL2** database within *GeoTool*, for date **2024-08-17 19:10:45:00** in the Kamchatka peninsular.

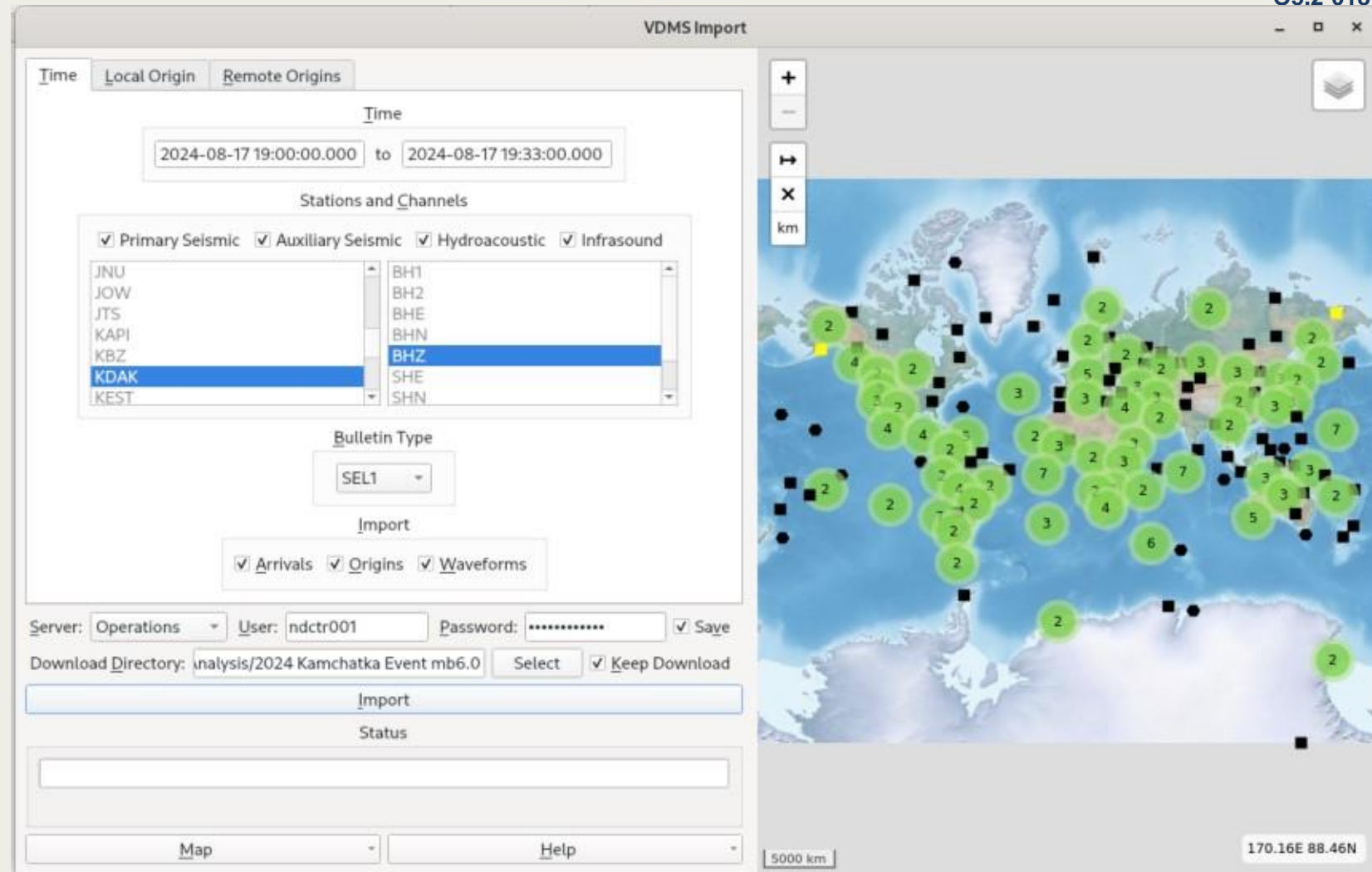


Fig 3: Waveform data import using the VDMS option





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## DATA & METHODS – 1b

### a) Waveform Seismic data:

- Analysis of waveform seismic data (signal ID **26607586**) from stations **BIL**, **JKA**, **PD**, **YSAH**, **IL31**, **MA2**, **KDAK** using *GeoTool*

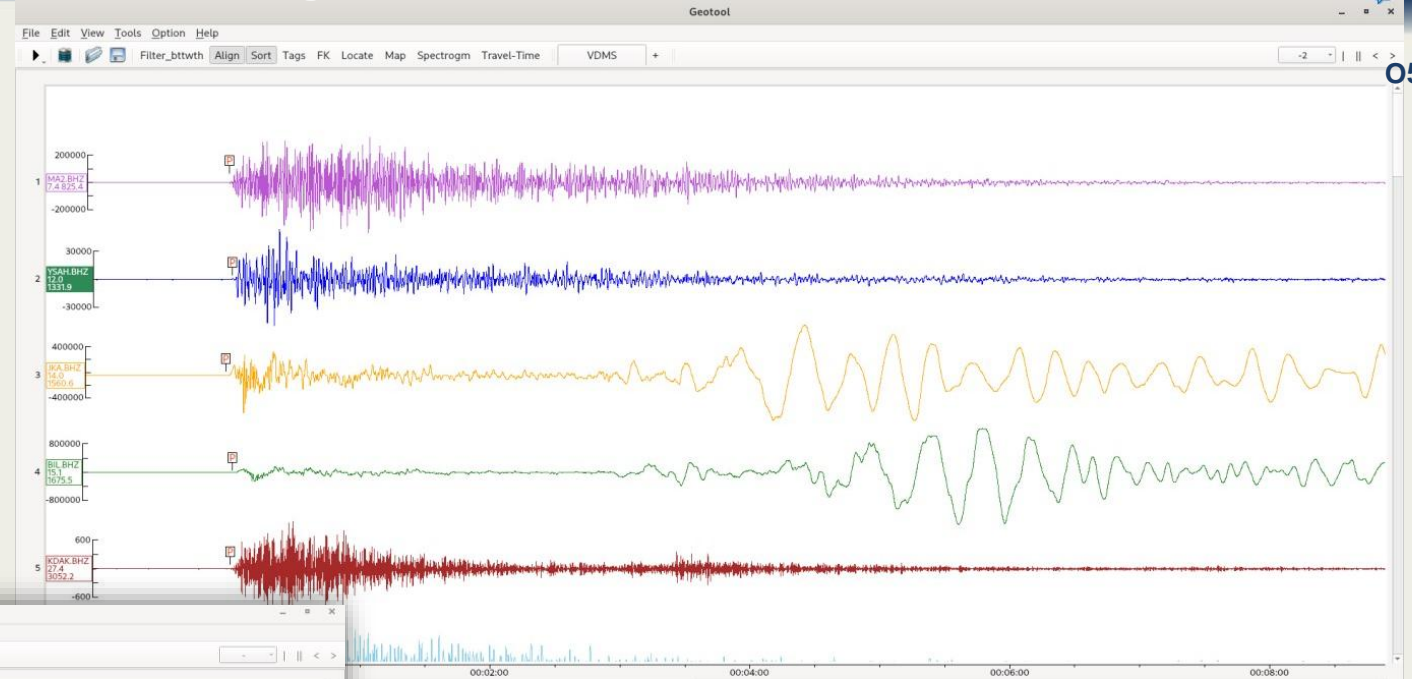


Fig 4: Single station waveform data analysis

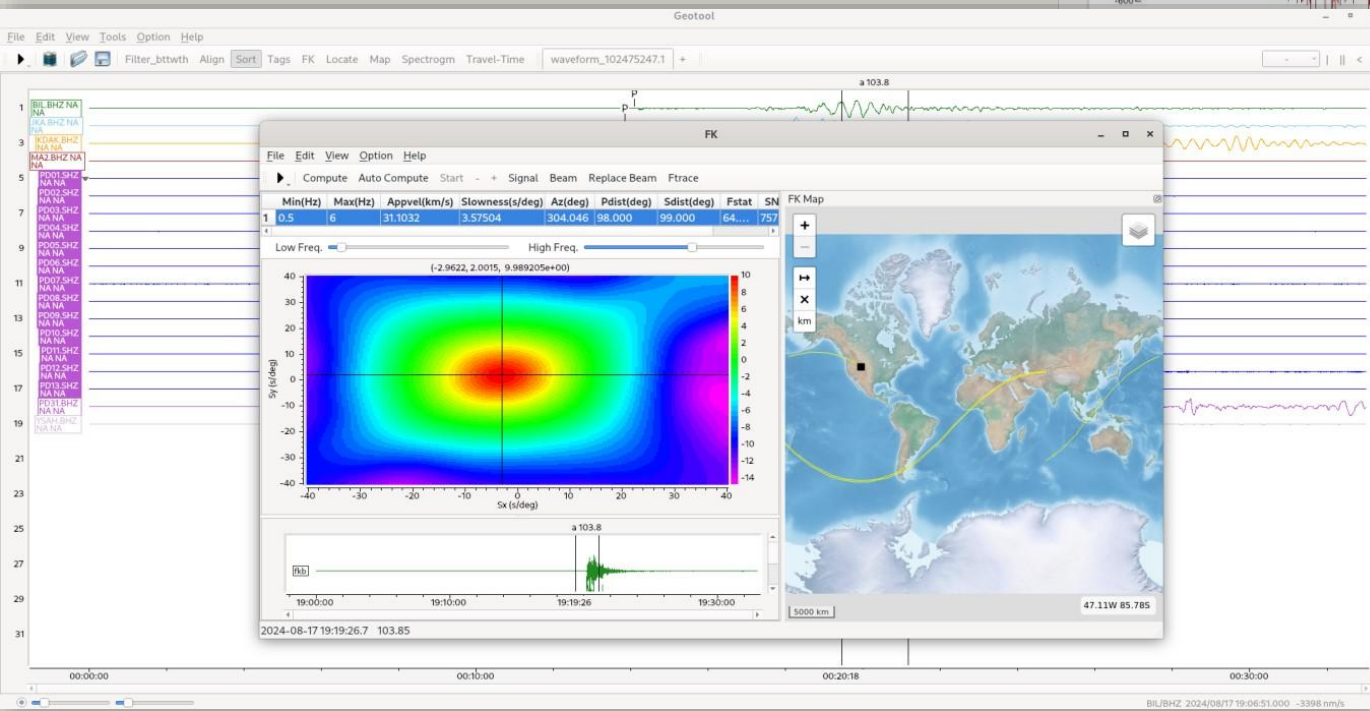


Fig 5: Array waveform data analysis

## DATA & METHODS-2a

### b) Infrasonid data:

- Collection of infrasonid data - Secure Web Portal **SEL3** database, date **2024-08-18 08:00:00** for the Kamchatka peninsular.

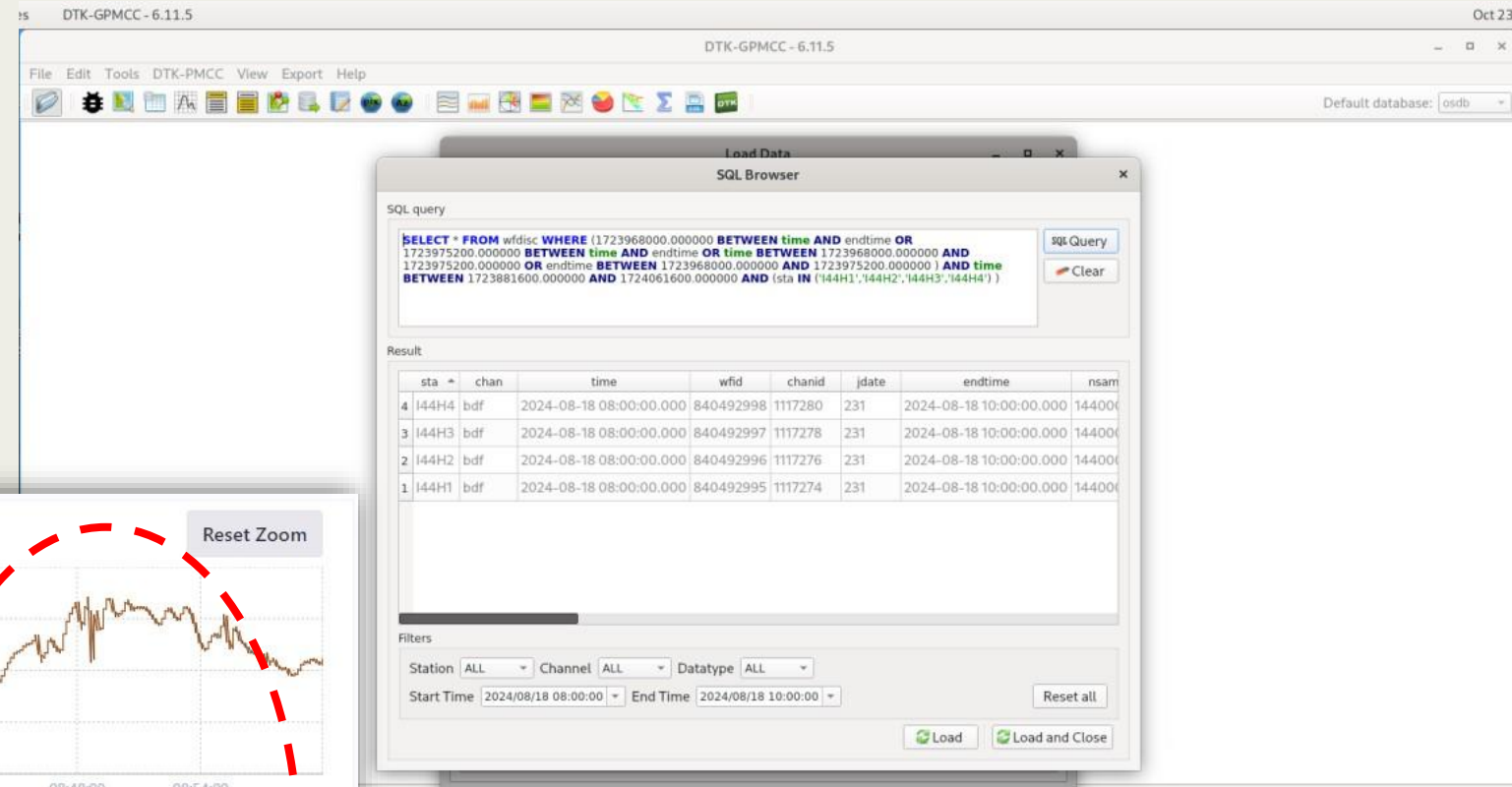
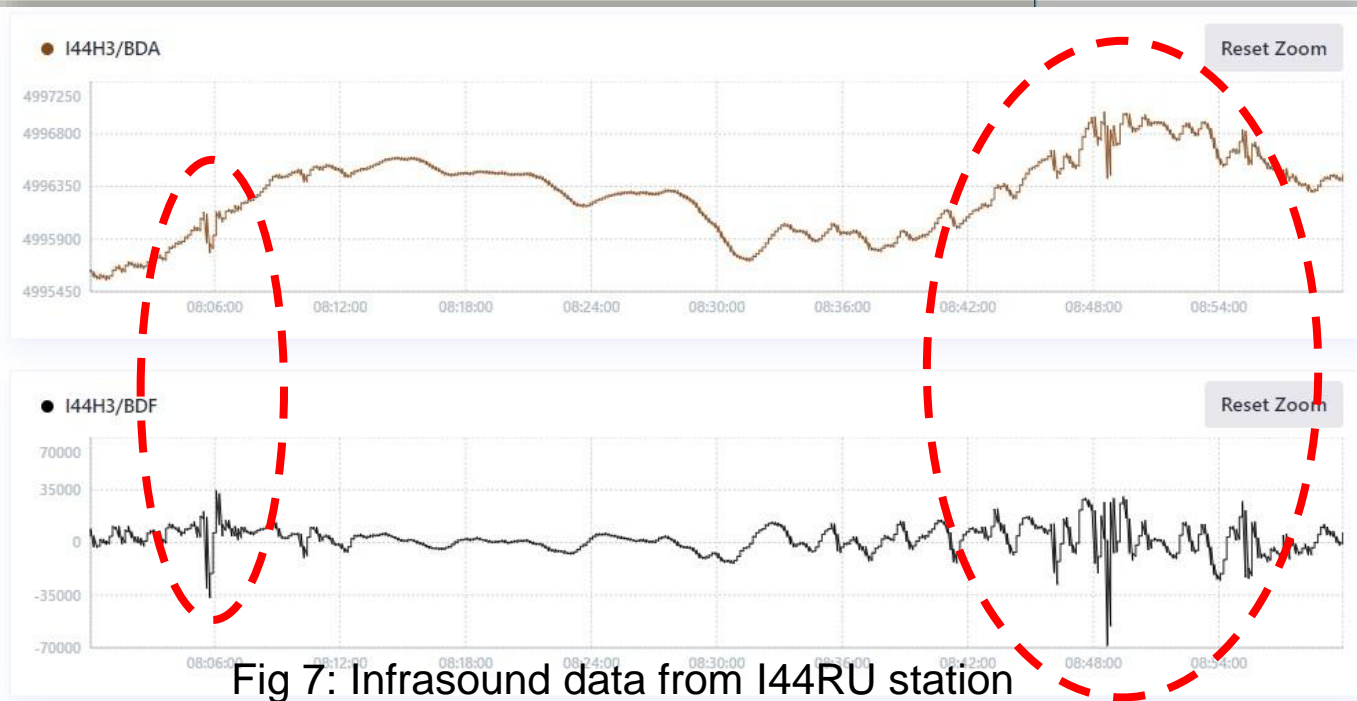


Fig 6: Infrasonid data import using SQL Browser





## DATA & METHODS-2b

### b) Infrasound data:

- Analysis of infrasound data (signal **ID231**) from station **I44RU** using *DTK-GPMCC*.

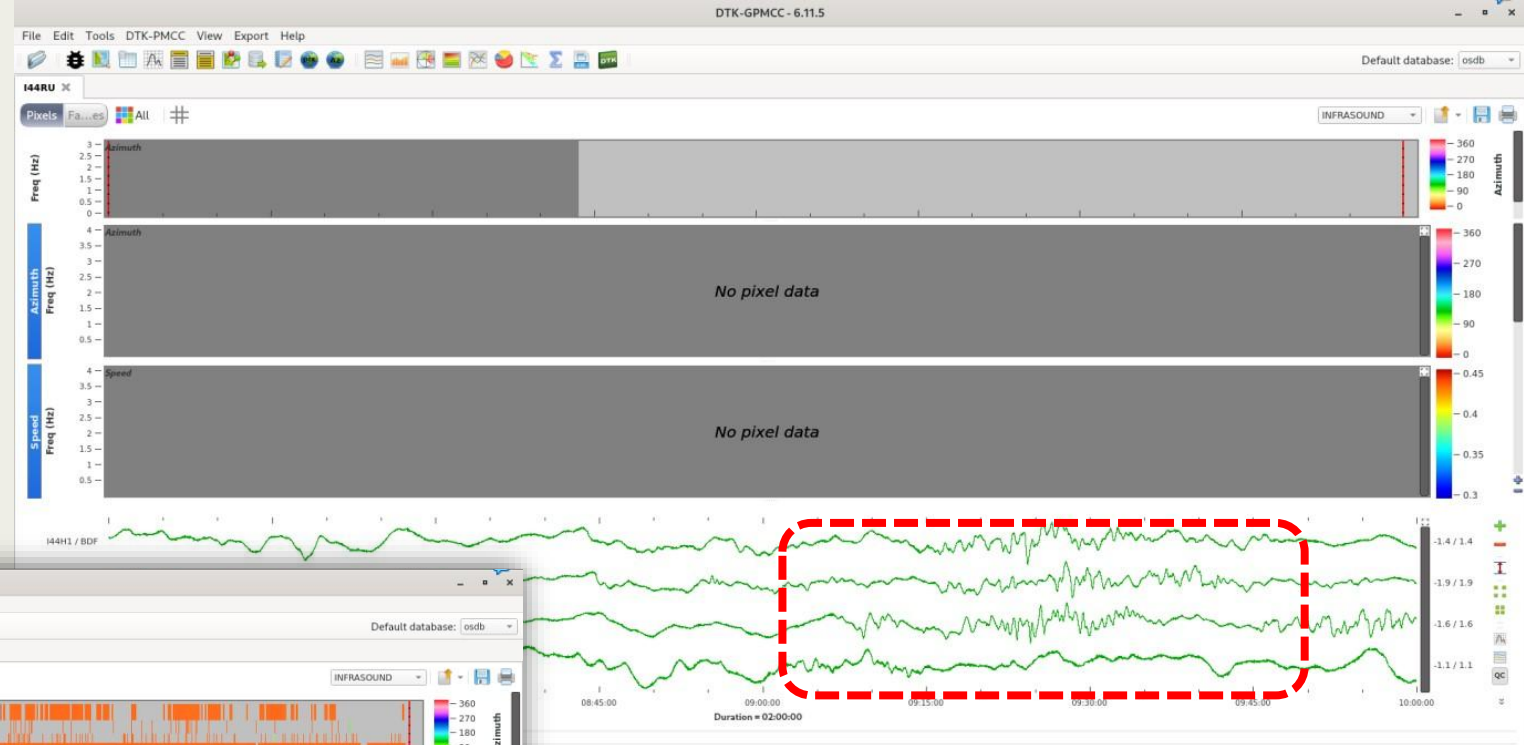


Fig 8: Raw infrasound data in DTK-GPMCC

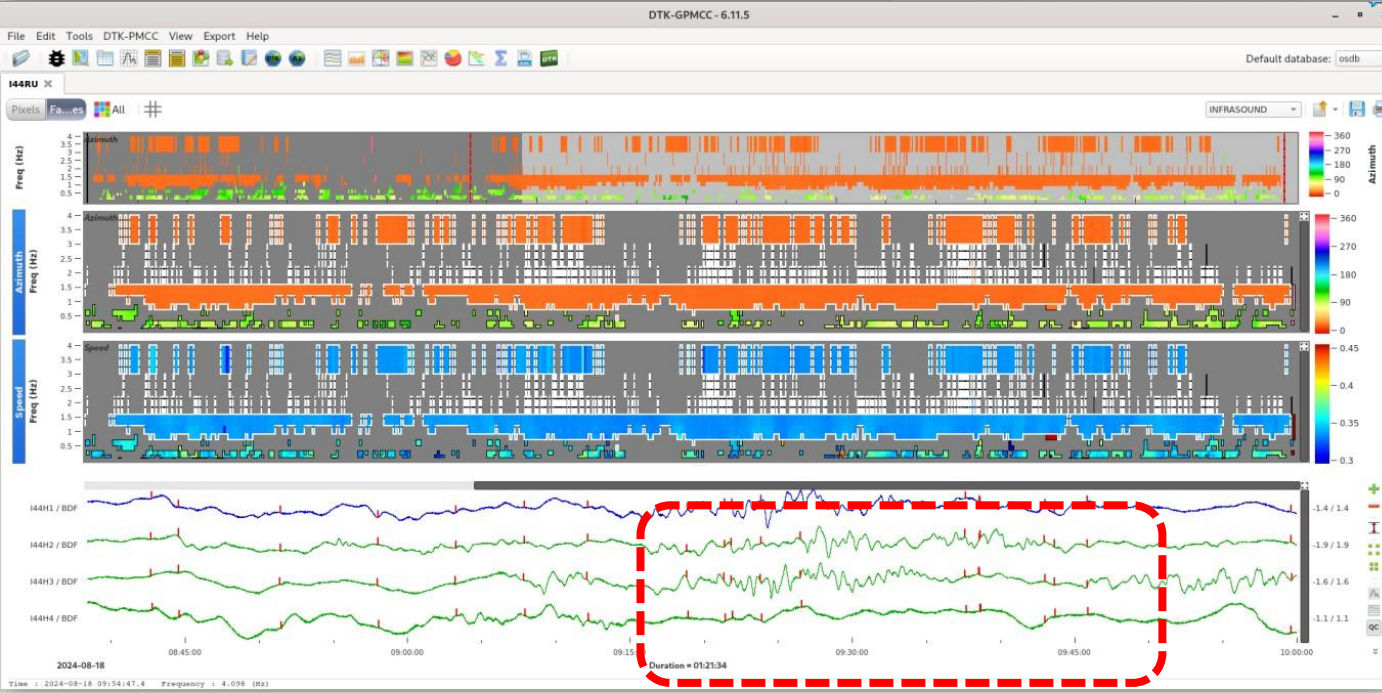


Fig 9: Infrasound signals of Interest

## RESULTS-1

### a) Location solution for the m6.0 event:

- Near **Severnye Koryaki** (**53.58°N, 158.42°E**) about **390km** south of the Shiveluch volcano.

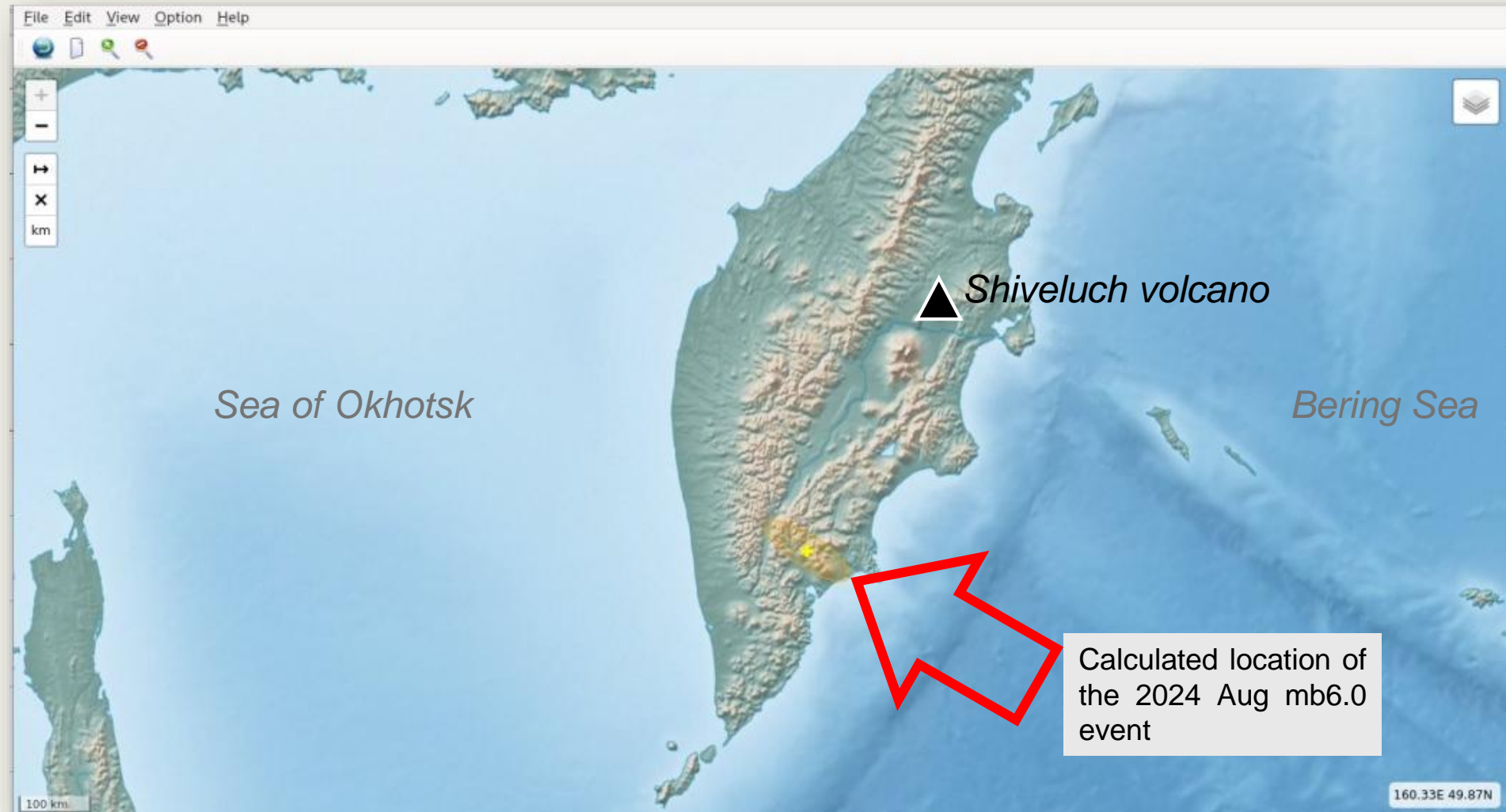


Fig 10: Computed location solution for the 2024 mb6.0 Kamchatka event





## RESULTS-2

### a) Azimuth solution for the 2024-08-18 eruption of Shiveluch volcano:

- **30° azimuth** from Station I44RU.

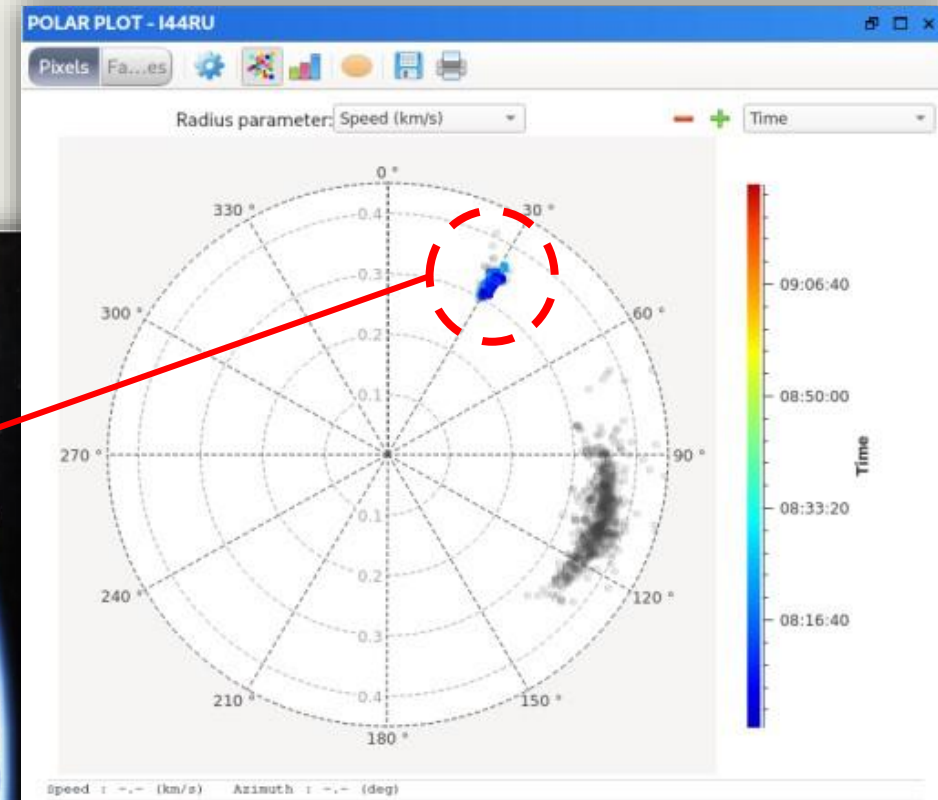
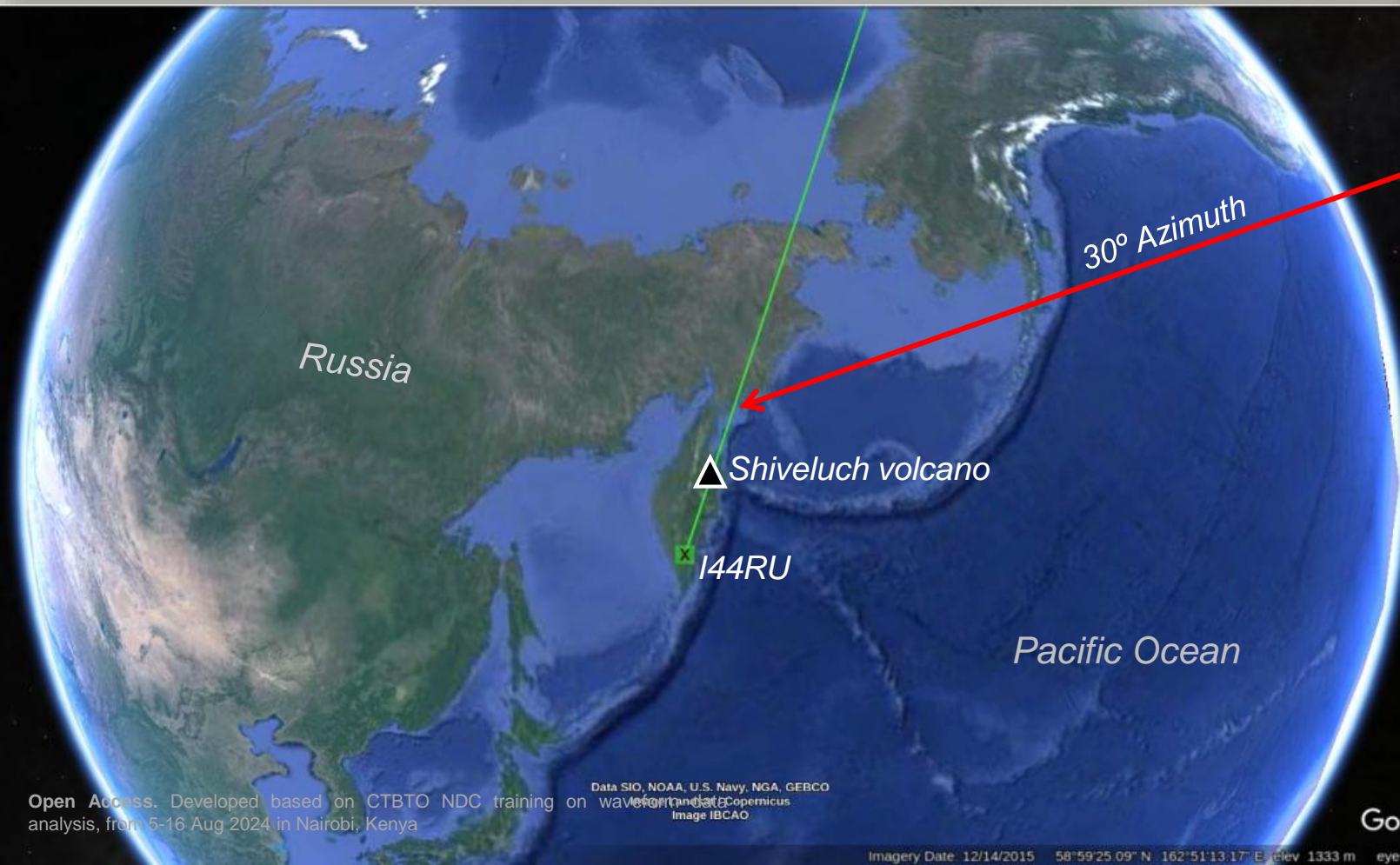
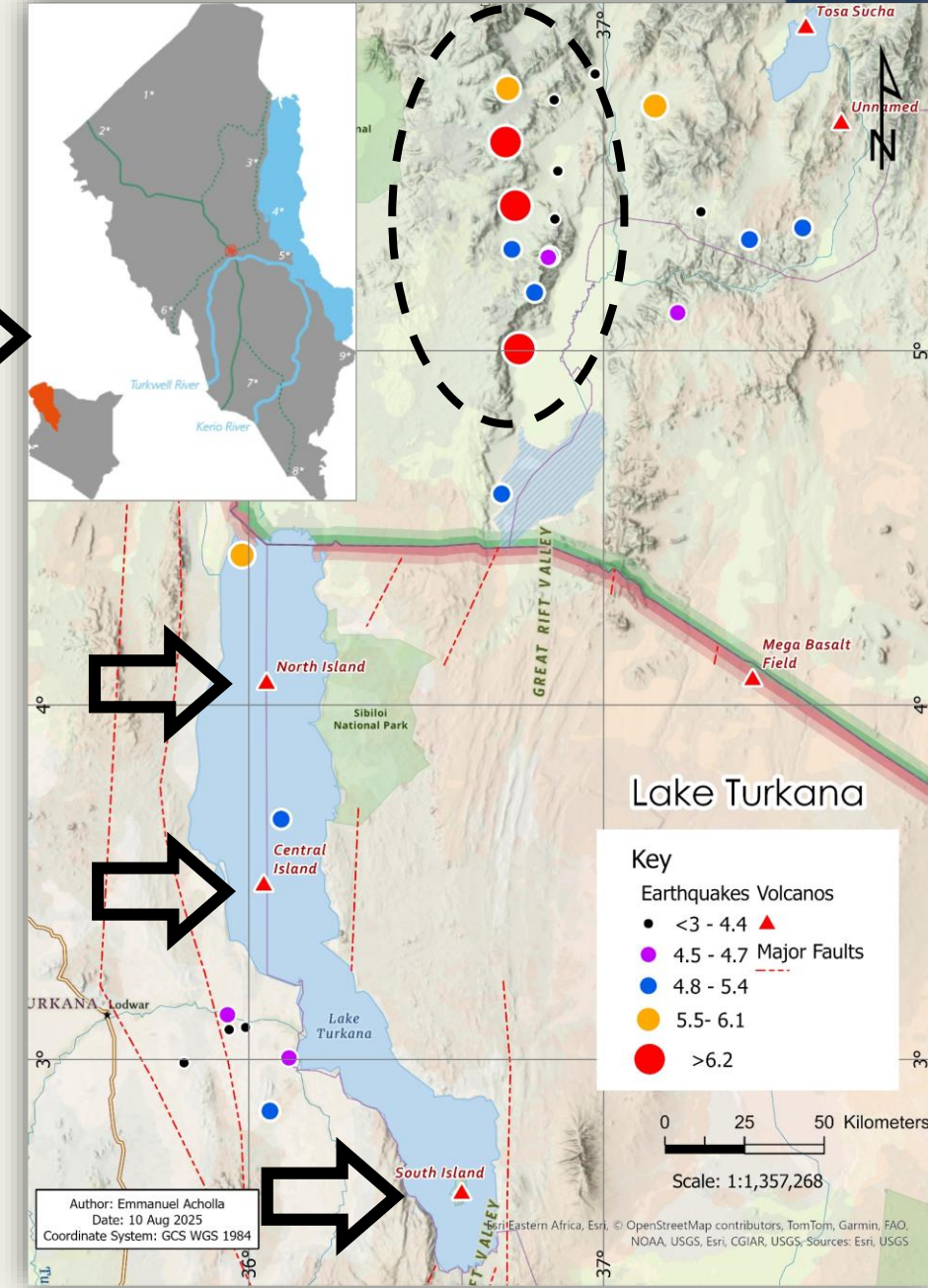


Fig 11a: Azimuth solution for the Shiveluch volcanic eruption  
11b: Polar plot of the infrasound data from the Shiveluch eruption



### CONCLUSIONS & WAY FORWARD

1. The proximity of the Shiveluch volcanic eruption to the mb6.0 earthquake epicenter highlights the potential for **large local earthquakes** to trigger **coupled volcanicity**.
2. The **CTBTO NDC-in-a-Box suite (*GeoTool* and *DTK-GPMCC*)** are effective tools for retrieval, inspection and analysis of **infra-seismic data** from **sources of geohazards**.
3. Kenya's **preparedness for geo-hazards** can be **significantly improved** through:
  - ✓ **data and systems integration (IMS+K.E-NDC+National Disaster Operations Center),**
  - ✓ **facilitated by mutual collaborative framework (GoK+CTBTO) and**
  - ✓ **targeted capacity building (K.E-NDC+NDOC staff).**





## REFERENCES

- **Comprehensive Nuclear Test Ban Treaty Organization (2024)** Secure Web Portal. IRL: <https://swp.ctbto.org/web/swp/sel3> Last Accessed: 22-10-2024.
- **Comprehensive Nuclear Test Ban Treaty Organization International Data Center (2025)** NDC-In-A-Box. All Rights Reserved. URL: <https://swp.ctbto.org/>

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