O5.2-018

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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8 SEPTEMBER
9 TO 12 SEPTEMBER

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INTRODUCTION

On **17TH 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 **9,000-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.

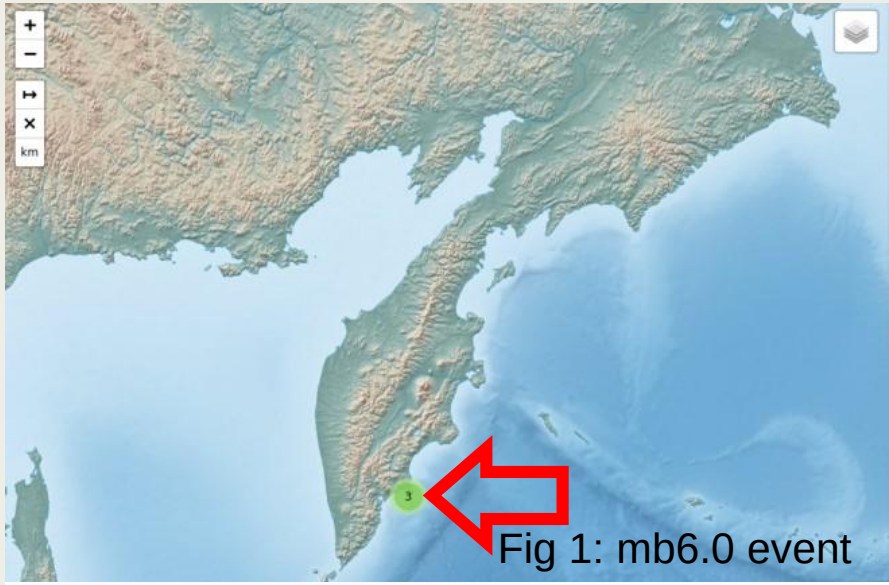

Fig 1: mb6.0 event

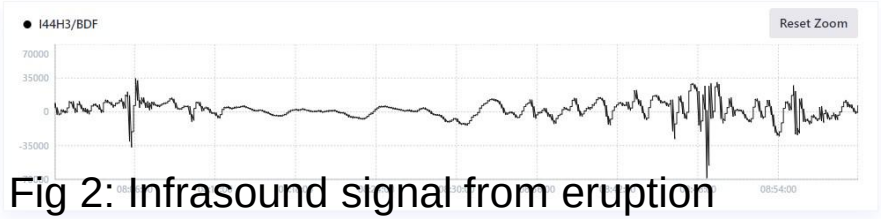

Fig 2: Infrasound signal from eruption

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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**

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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.

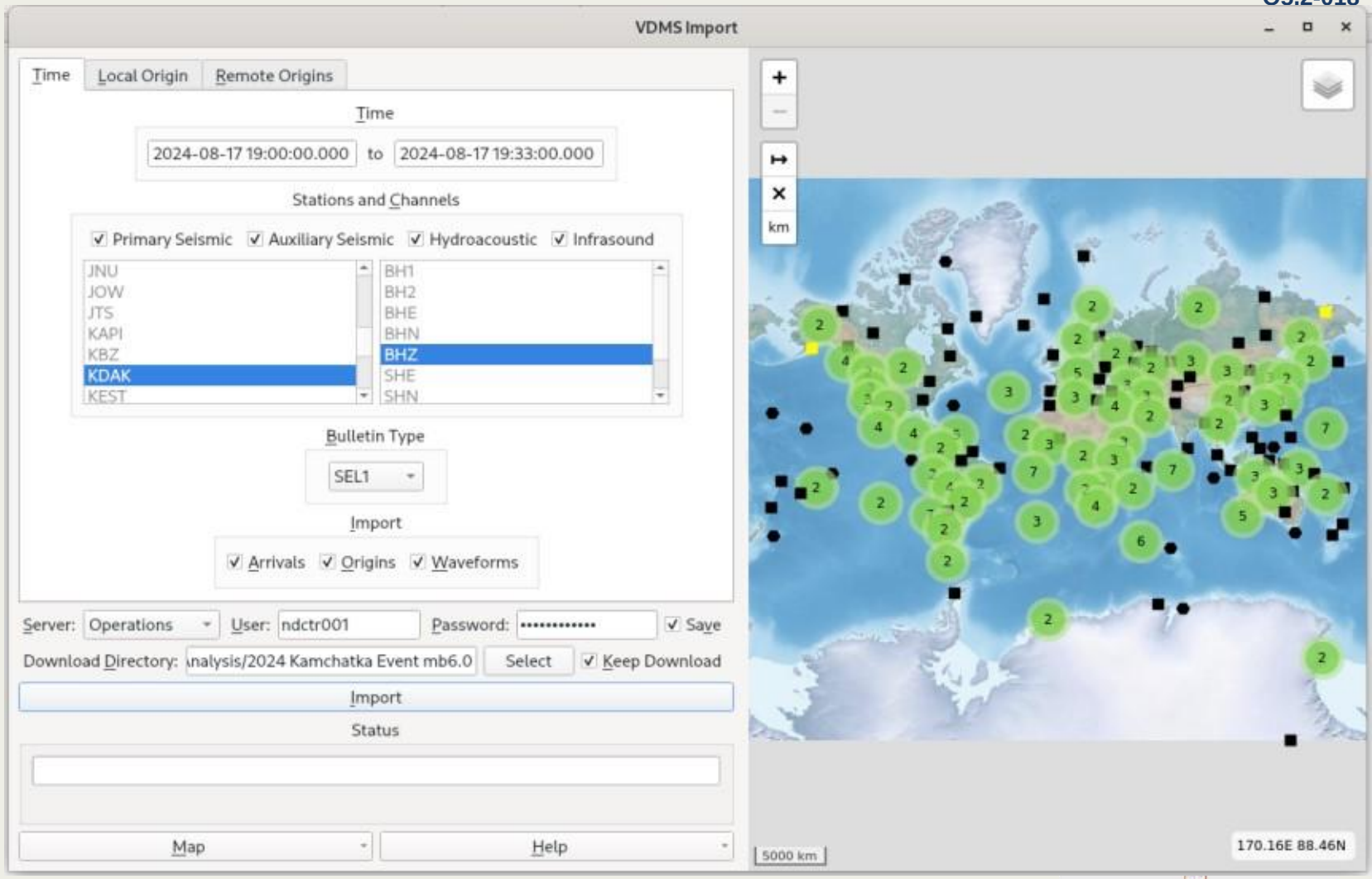

Fig 3: Waveform data import using the VDMS option

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DATA & METHODS – 1b

a) Waveform Seismic data:

- Analysis of waveform seismic data (signal **ID 26607586**) from stations **BIL, JKA, PD31, YSAH, IL31, MA2, KDAK** using *GeoTool*

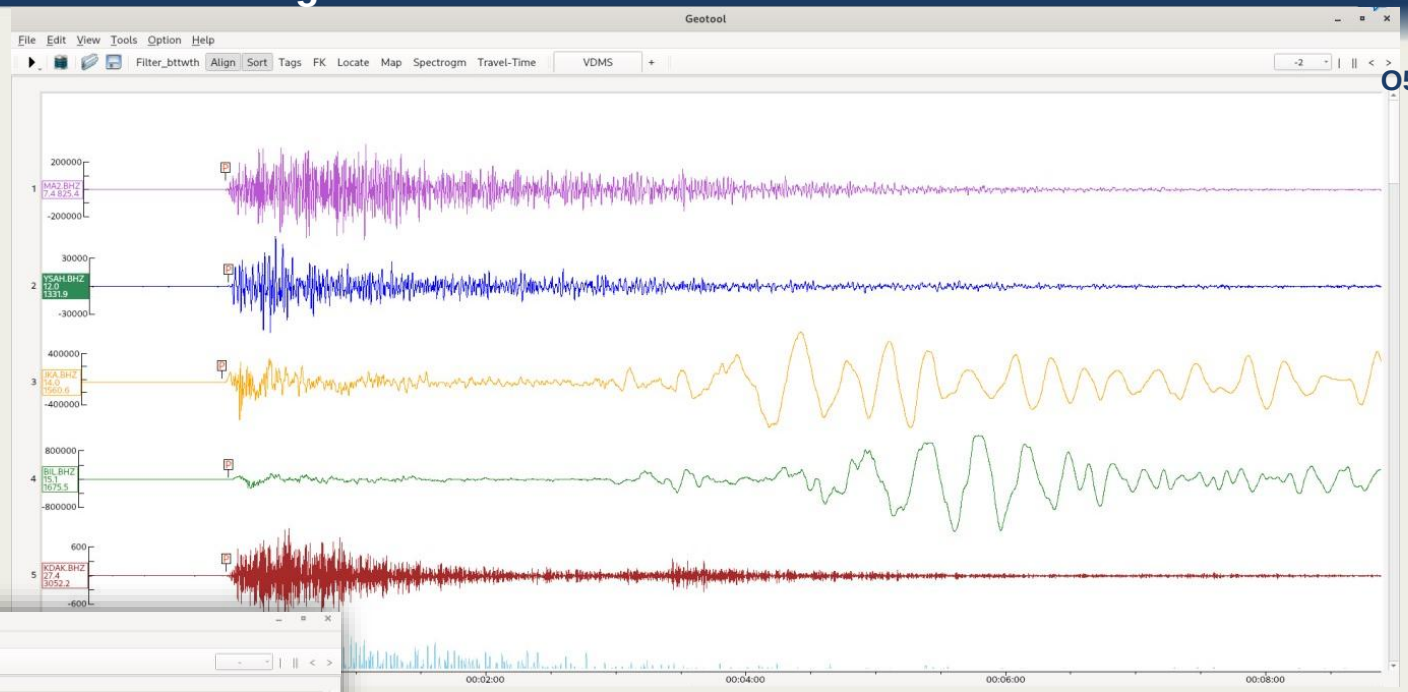

Fig 4: **Single station** waveform data analysis

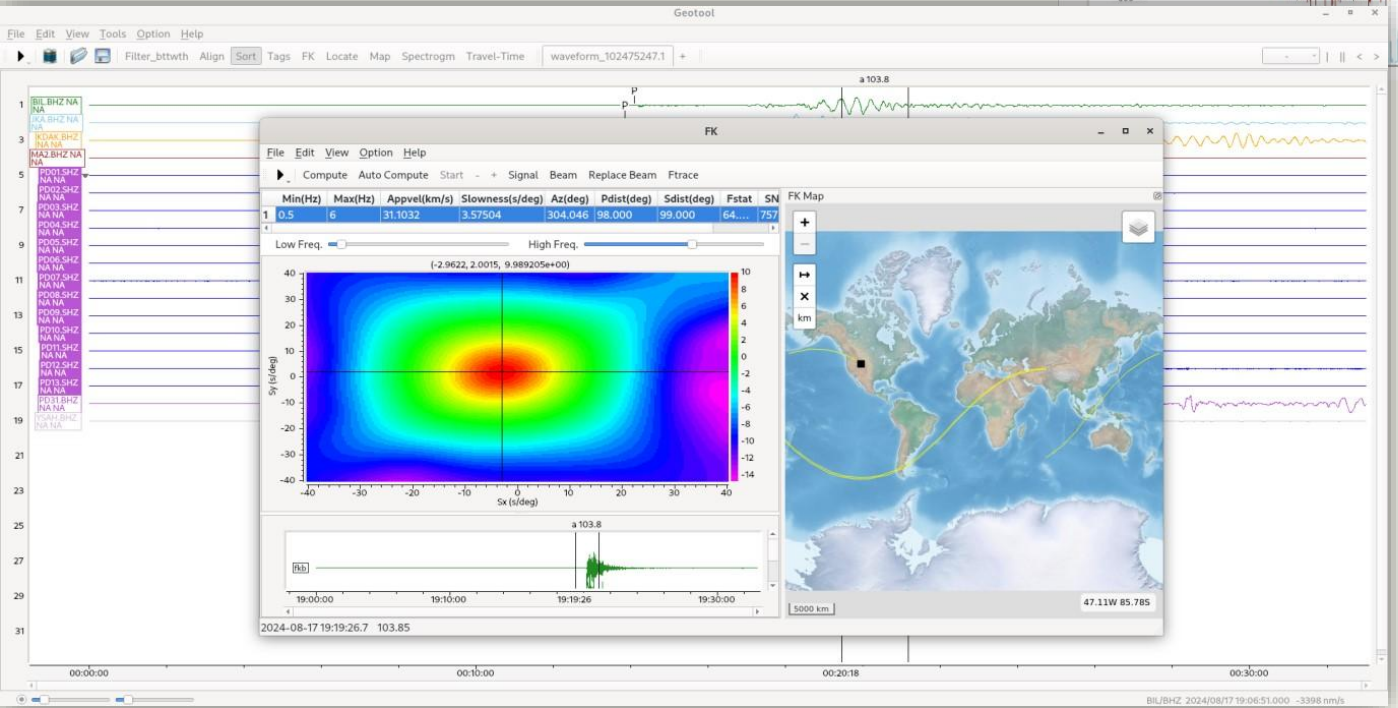

Fig 5: **Array** waveform data analysis

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DATA & METHODS-2a

b) Infrasound data:

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

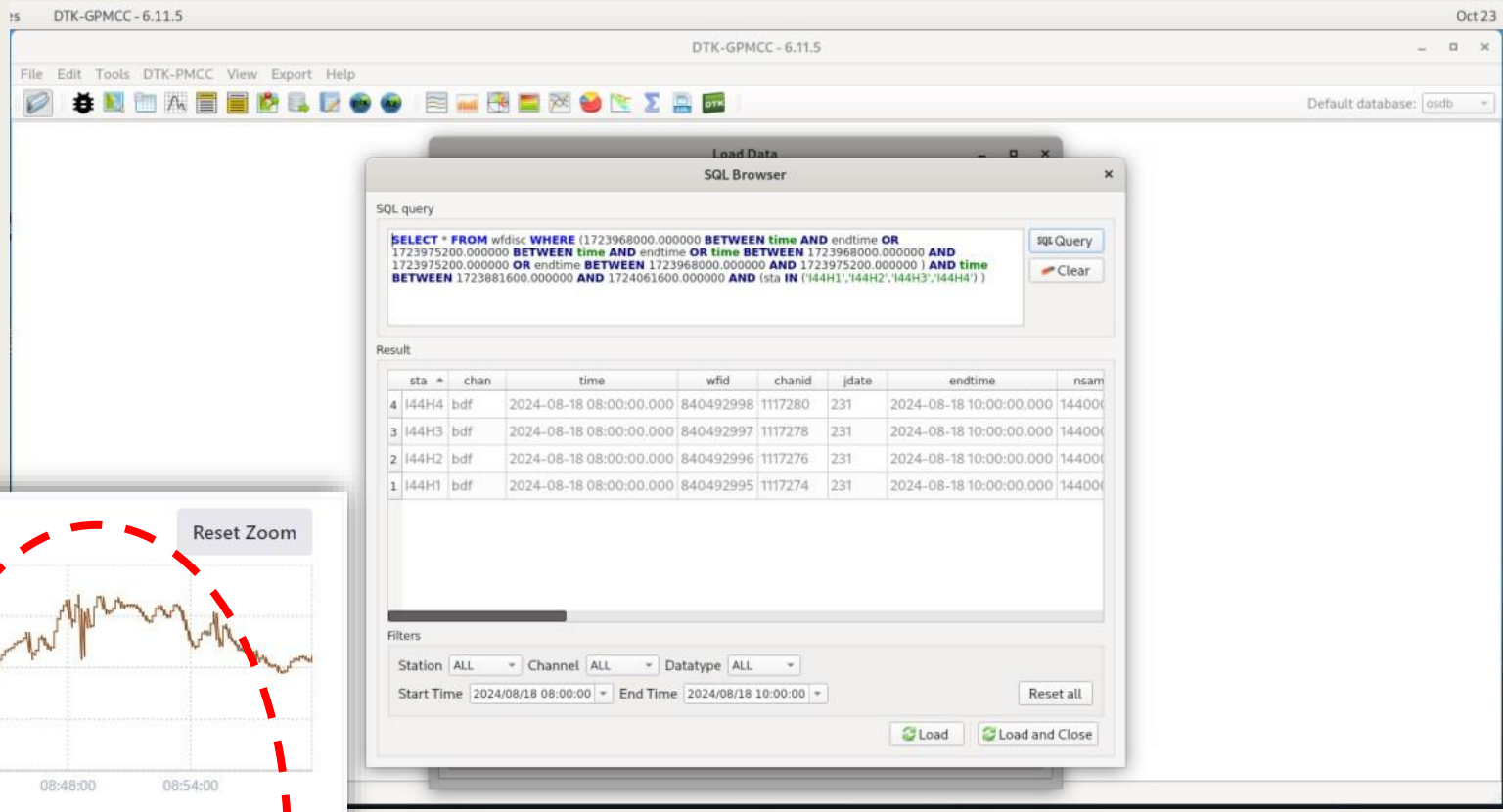

Fig 6: Infrasound data import using SQL Browser

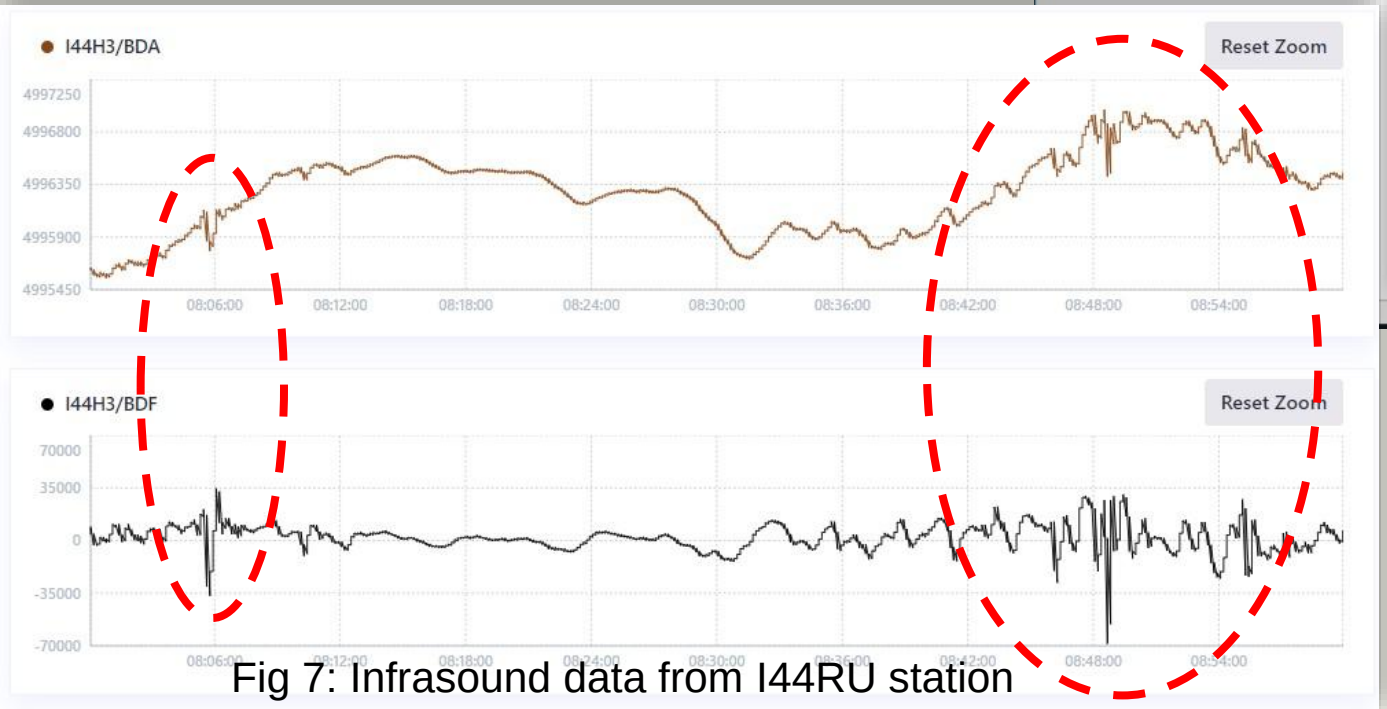

Fig 7: Infrasound data from I44RU station

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DATA & METHODS-2b

b) Infrasound data:

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

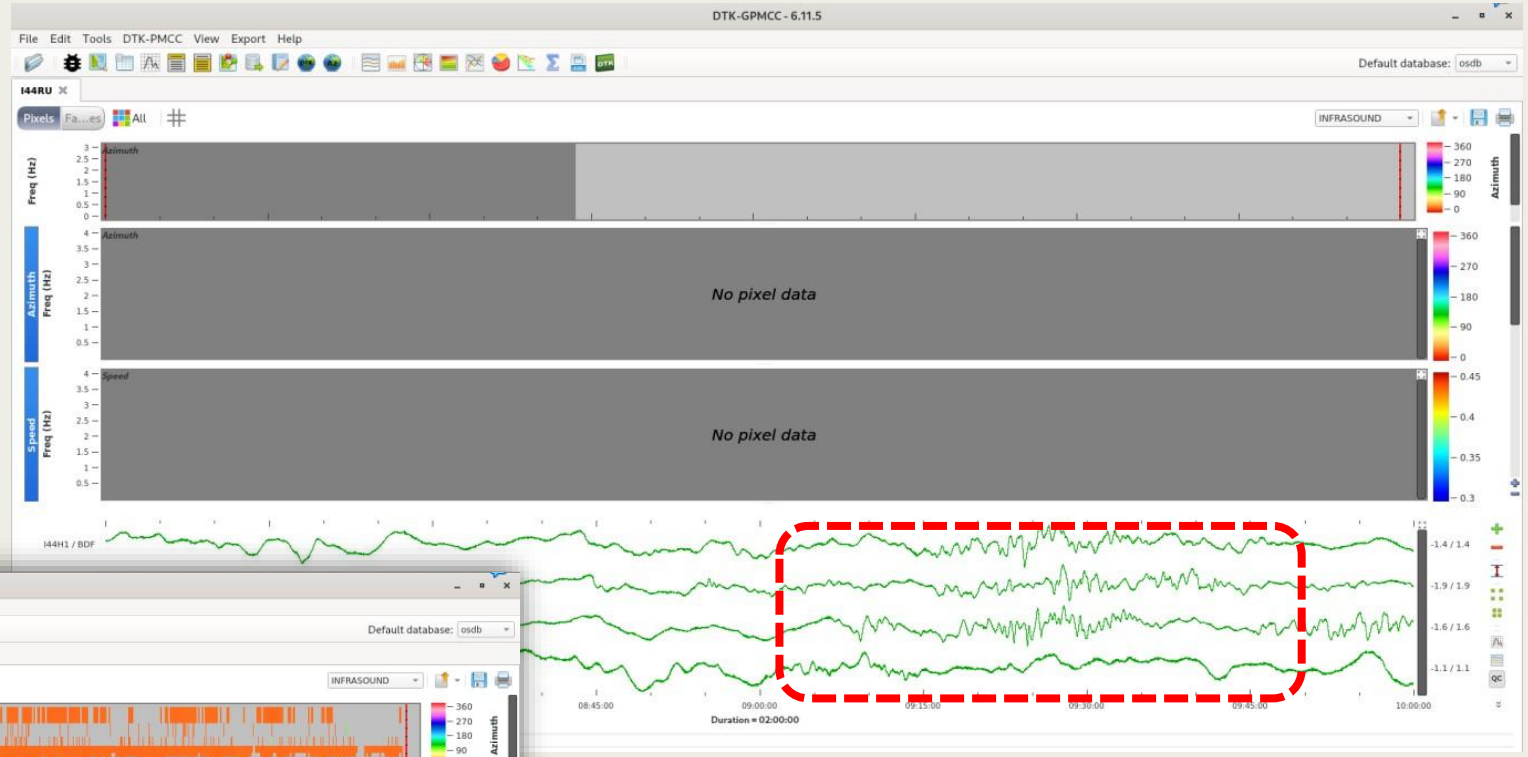

Fig 8: Raw infrasound data in DTK-GPMCC

Fig 9: Infrasound signals of Interest

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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.

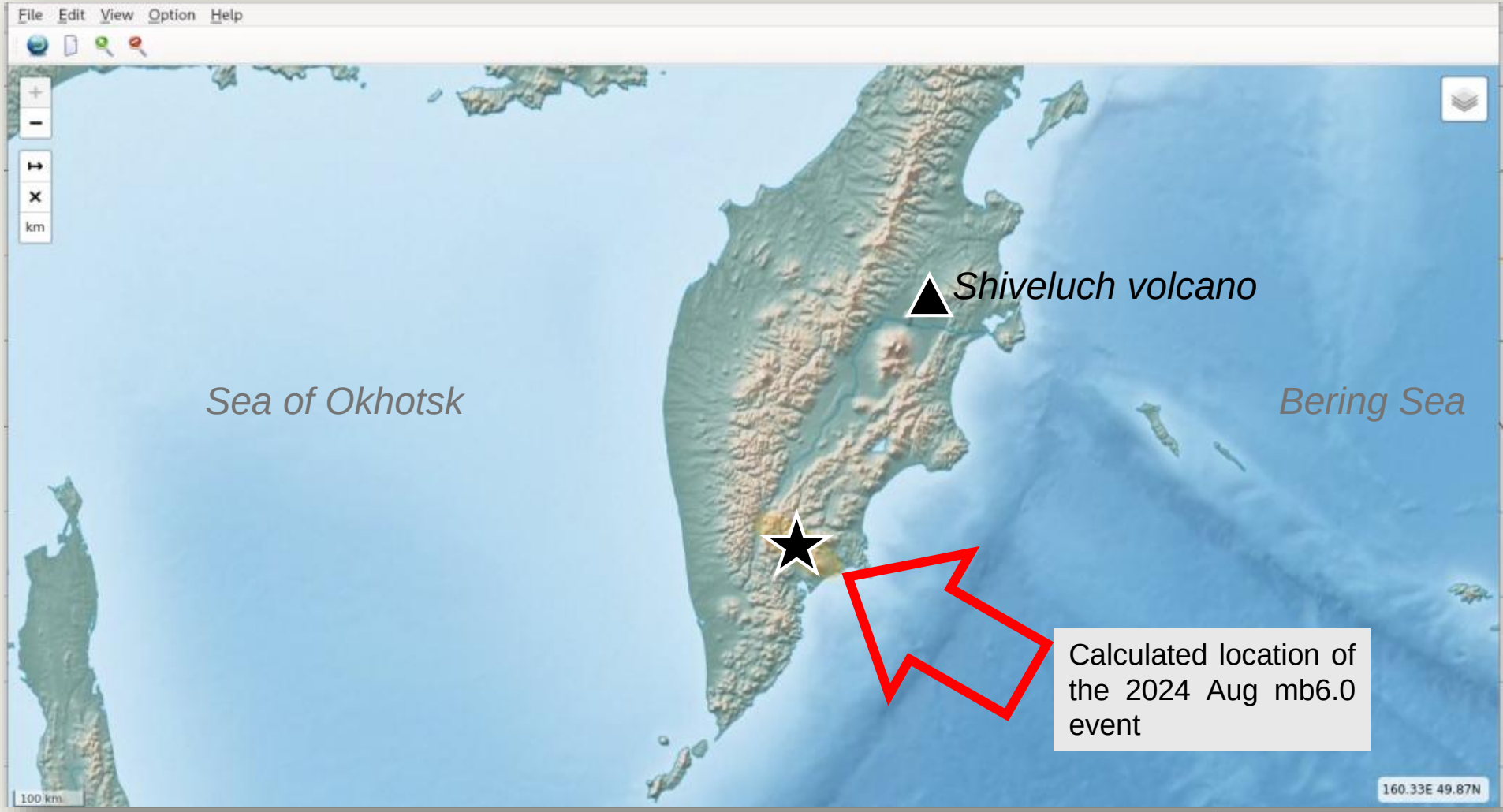

Fig 10: Computed location solution for the 2024 mb6.0 Kamchatka event

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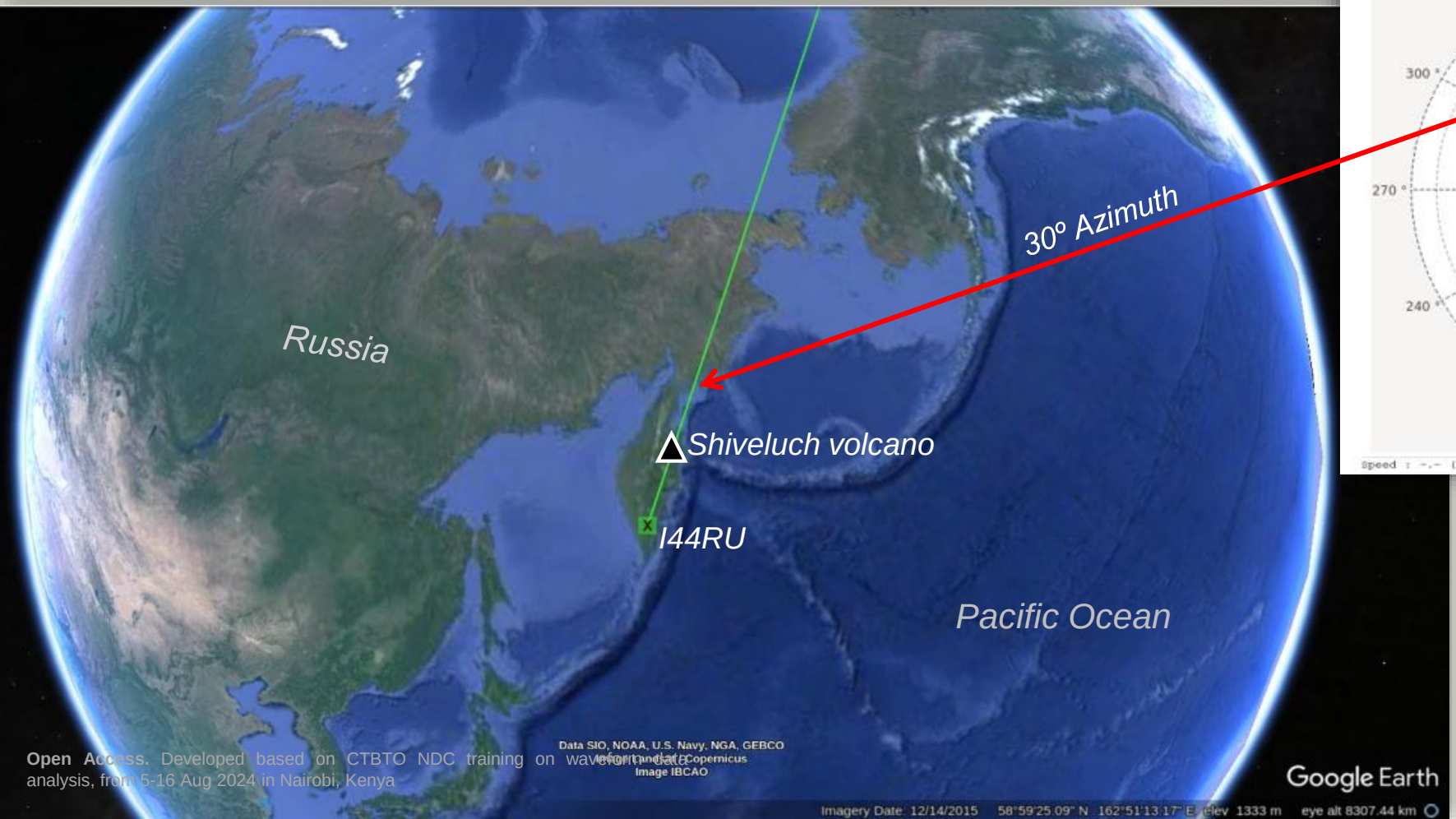
RESULTS-2

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

- **30° azimuth** from Station I44RU.



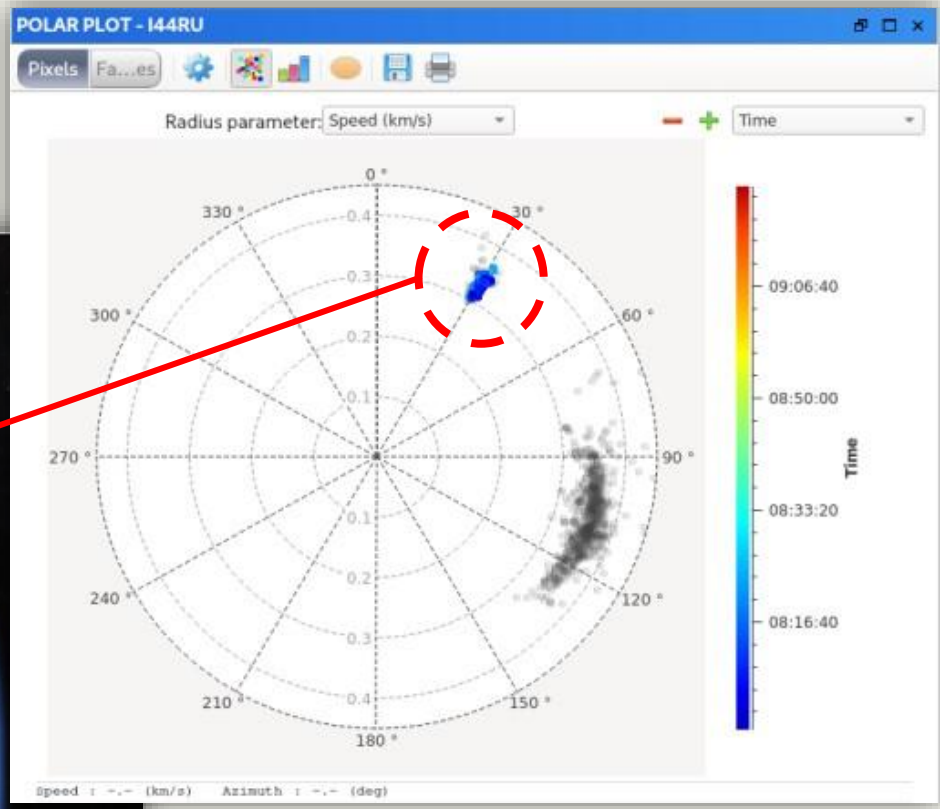


Fig 11a: Azimuth solution for the Shiveluch volcanic eruption
11b: Polar plot of the infrasound data from the Shiveluch eruption

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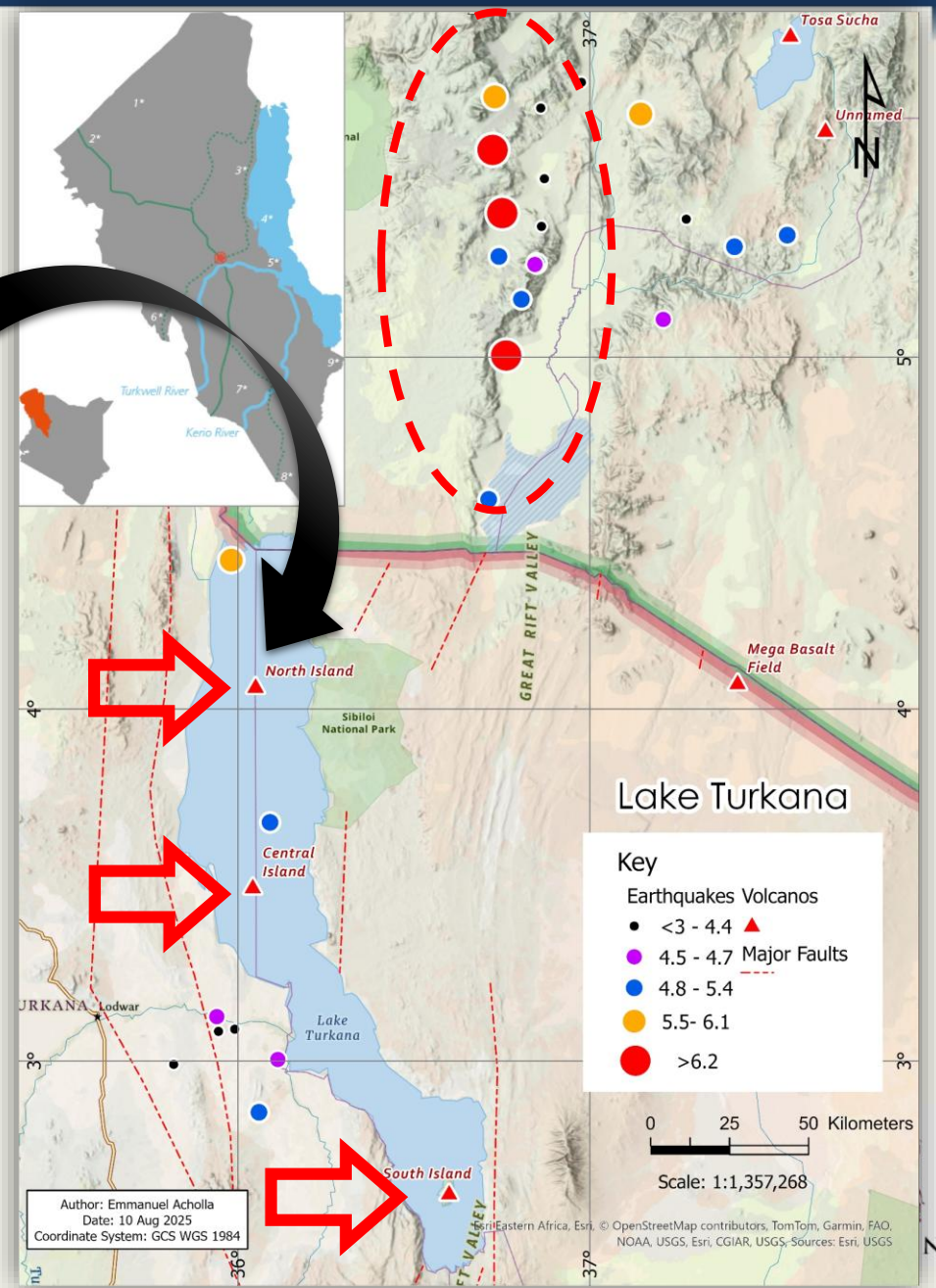
CONCLUSIONS & WAY FORWARD

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 ***DKT-GPMCC)*** are effective tools for retrieval, inspection and analysis of **infra-seismic data** from **geohazards**.

3. Kenya's **preparedness for geo-hazards** can be **significantly improved** through:
   - ✓ **data and systems integration (IMS-National Disaster Operations Center)**,
   - ✓ facilitated by **mutual collaborative framework** (GoK-CTBTO) and
   - ✓ targeted **capacity building (NDOC staff)**.



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- **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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