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Improvements of data analysis and capacity building by NDC - Costa Rica using IMS stations and advances in updating NDC-in-box programs

Hairo Villalobos

P5.3-288

Volcanological and Seismological Observatory Costa Rica

POSTER

OVSICORI-UNA
INSTITUTO DE INVESTIGACIÓN OBSERVATORIO VULCANOLÓGICO Y SISMOLÓGICO DE COSTA RICA

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Hairo Villalobos

Volcanological and Seismological Observatory Costa Rica (OVSICORI-UNA)
(hvillal@una.cr)

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ABSTRACT

NDC-Costa Rica, the real-time inclusion of IMS seismic stations and OVSICORI local seismic stations for monitoring local, regional, global seismic and infrasonic events automatically through SeisComp 3 acquisition system included in the NDC-in-a box. Some analysis of events data has been carried out, such as: explosion in the Port of Beirut (2020-08-04 15:08 UTC) where IMS stations were used: I26DE, I42PT, I11CV, I17CI, I48TN (infrasound), BRTR, IDI, ASF, EIL, MMAI (seismic) and Stromboli Volcano eruption event in Italy (2019-07-03 14:45 UTC) through infrasound stations: I26DE, I37NO, I42PT, I48TN. In addition, in recent years all data analysis programs such as Geotool, DTK-GPMCC, DIVA, Webgrape, SeisComP 3 have been updated to be accessible to NDC-Costa Rica users for data analysis.

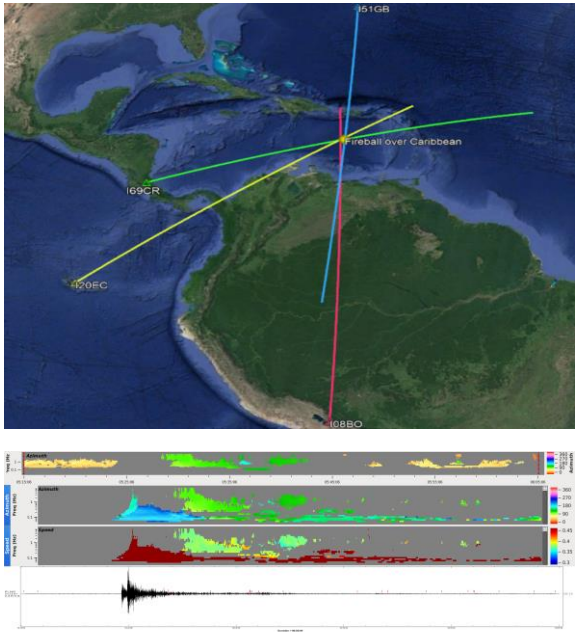

Fig. 1. Infrasound analysis by NDC-CR

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INTRODUCTION

NDC-CR and OVSICORI network (OV) integrates about 80 local and 50 international seismic stations, they complement the seismic station AS025 to achieve local, regional and global locations of seismic events close to Costa Rica. The users of the NDC-CR have carried out different types of training in the 4 monitoring technologies of the IMS for characterization of nuclear and natural events.

Fig. 2. AS025 station of IMS

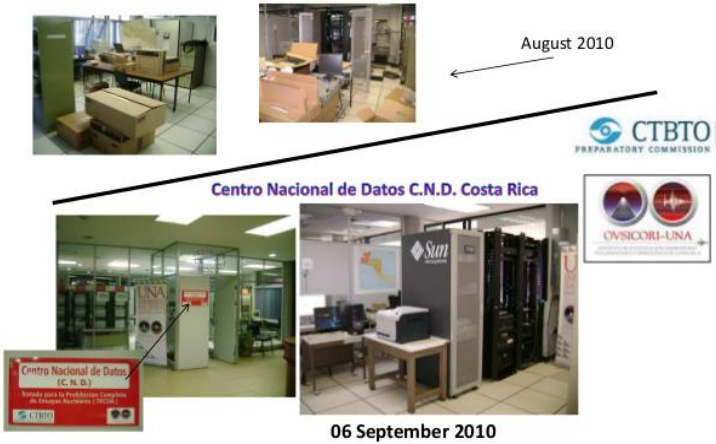

Fig. 3. NDC-CR Server CBS

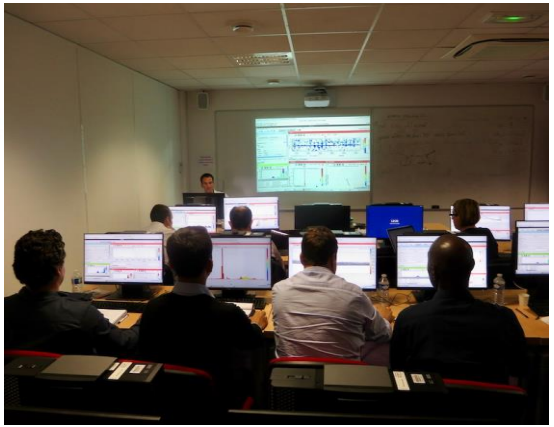

Fig. 4. Advance Infrasound Training CEA-CTBTO (2019)

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METHODS

NDC-CR improvements have been made to the seismic data acquisition SC3 server, such as the OVSICORI local system and the NDC-CR system, the two acquisition systems work in parallel. Only the NDC-CR server includes more regional and global stations and automatic bulletins from REB-IDC.

In addition to the NDC-CR being directly connected to the main SC3 system, it contains the SHI-ENIAB and RN-ENIAB with all data analysis programs for NDC-CR users.

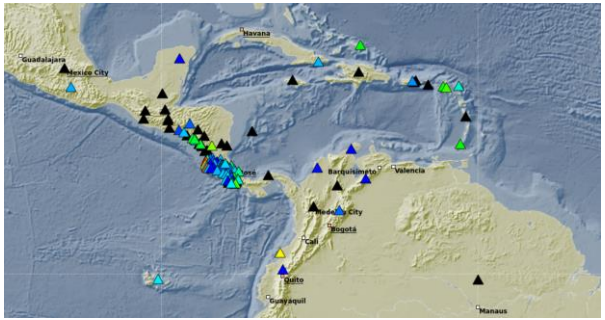

Fig. 5. Network Station Map NDC-CR server

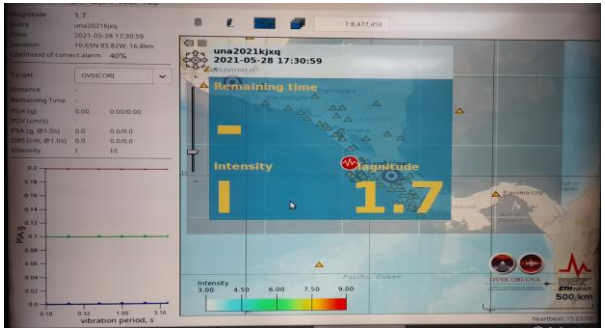

Fig. 6. EEW system from SC3 local acquisition process

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RESULTS

Stromboli Volcano eruption event in Italy (2019-07-03 14:45) UTC)

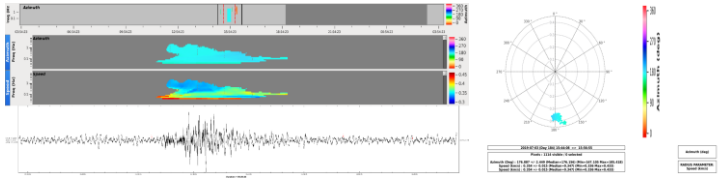

Fig. 7. I26DE detections and analysis

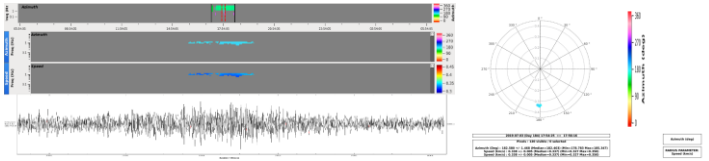

Fig. 8. I37NO detections and analysis

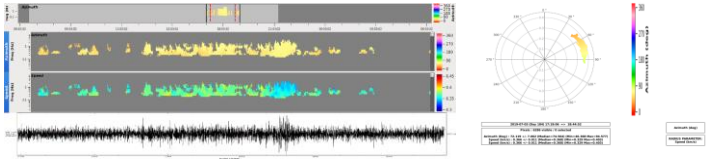

Fig. 9. I42PT detections and analysis

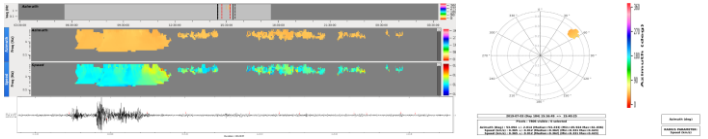

Fig. 10. I48TN detections and analysis

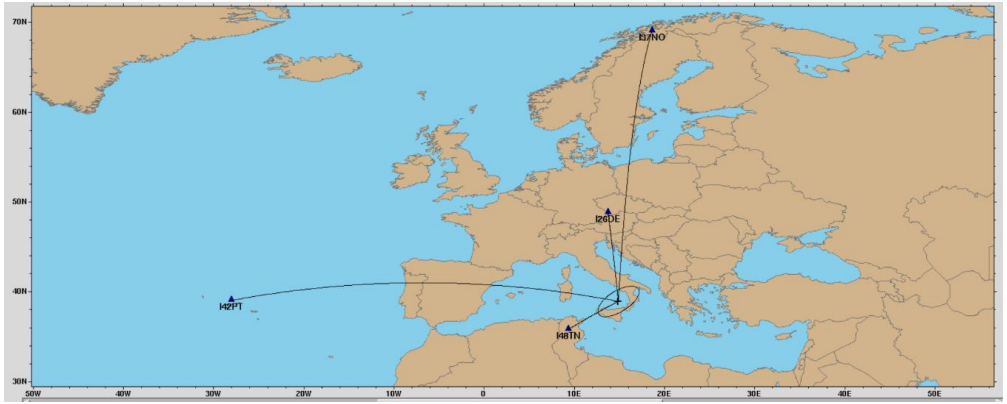

Fig. 11. Event location with Geotool using infrasound technology

The explosion generates an eruption column that quickly rises more than 2 km, probably reaching approx. 4-5 km height before spreading into a mushroom cloud. VAAC Toulouse issued a warning of ash in possibly up to 10 km altitude

Fig. 12. Stromboli Volcano eruption (2019-07-03)

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RESULTS

Explosion in the Port of Beirut, Lebanon (2020-08-04 15:08 UTC)

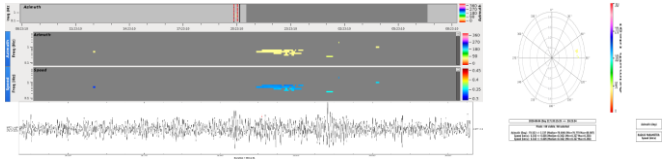

Fig. 13. I42PT detections and analysis

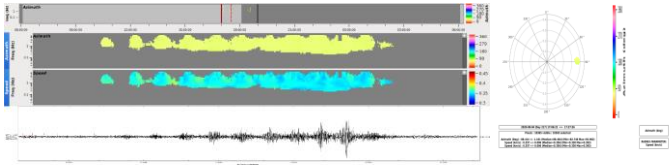

Fig. 14. I48TN detections and analysis

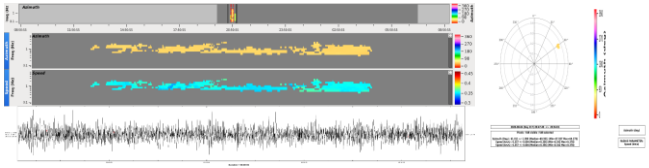

Fig. 15. I11CV detections and analysis

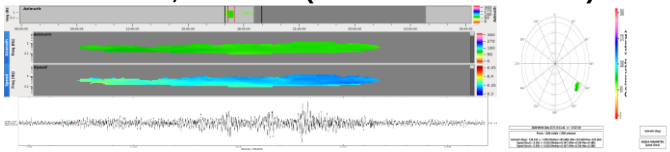

Fig. 16. I26DE detections and analysis

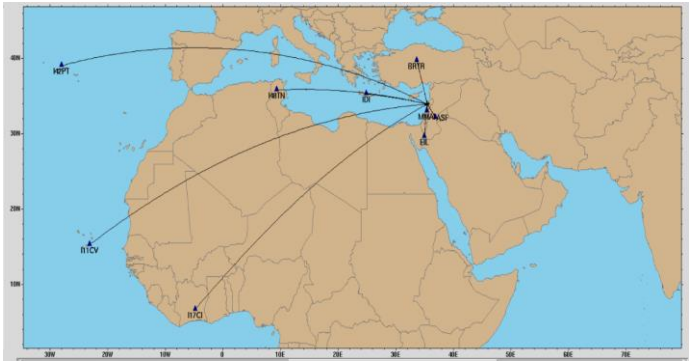

Fig. 17. Event location with Geotool using seismic - infrasound technology

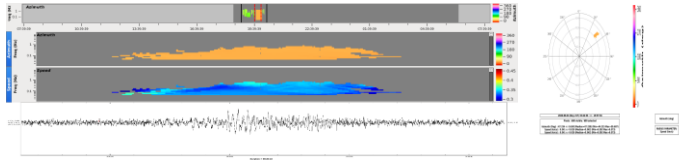

Fig. 18. I17CI detections and analysis

Seismic solution by NDC - CR
Magnitud: 3.4 ML
Latitude, Longitude: 33.90 °, 35.52 °
Depth: 0.0 km

Fig. 19. Explosion in Beirut

2750 tons of ammonium nitrate which is roughly equivalent to 1100 tons of TNT

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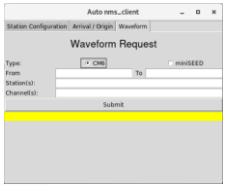
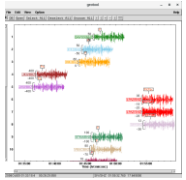
NDC-CR update of data analysis programs for users

Seismic – Hidroacoustic - Infrasound

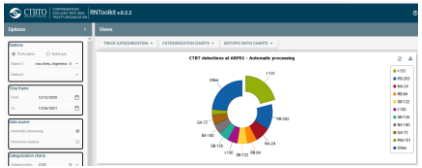
SHI-NIAB_Mar2020_CentOS7.7_x86_64_ver5.1
Apagada

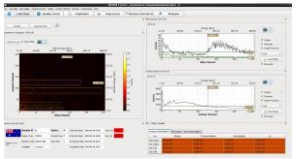


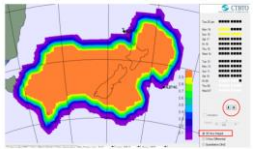


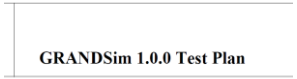
Radionuclides

RN-NIAB_Feb2021_CentOS7_ver.4.1
Apagada









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CONCLUSIONS

- Improve data analysis capabilities by NDC-CR in Infrasound, Hydroacoustic and Radionuclide technologies to locate different kind of events.
- Have more cooperation in research projects between NDCs in the region of Central America, the Caribbean and South America.
- Include more national institutions that cooperate in the use of the data available in the NDCs.
- Host in the future with Workshops on NDC and OSI technologies.