

## Interactive analysis perspective on the implementation of the NET-VISA in the IDC bulletin production

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### INTRODUCTION

CTBTO IMS station data are being processed by automatic processing (GA), interactively analysed, and reviewed, resulting in IDC bulletins. The NET-VISA is designed to process IMS data to reduce the number of missed and false events in automatic processing.

### METHODS/DATA

NET-VISA has been implemented in operation as an additional event scanner tool since January 2018. In this study, we assess the effect of the NET-VISA automatic scanner on the number of events in the IDC REB and LEB bulletins.

START

### RESULTS

We used three distinct time periods to evaluate the NET-VISA performance. The results show a 4.6% increase in the number of LEB events after including the NET-VISA scanner in operation, with an average of 7 events per day, and an increase of 17.90% in the number of scanned events.

### CONCLUSION

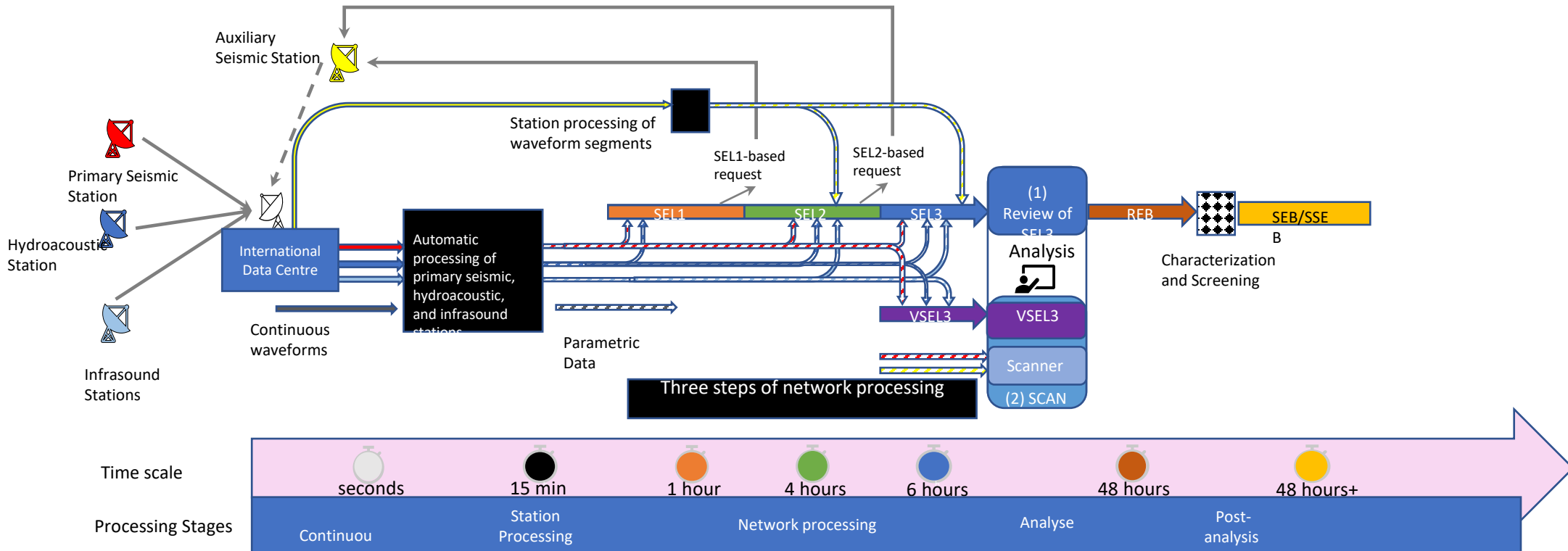
A comparison between the different bulletins in distinct periods shows NET-VISA is beneficial to build more valid events, providing opportunities to improve nuclear-test-ban monitoring.

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# Introduction

- Data from the International Monitoring System (IMS) stations of the CTBTO are being processed by automatic processing, Global Association, interactively analysed and reviewed, resulting in the International Data Centre (IDC) bulletins.
- Analysts first review the Standard Events List (SEL3), produced by the Global Association (GA).
- They then examine additional events brought to their attention by an auto GA scanner.
- NET-VISA is the next-generation SHI automatic event detector. It has been used operationally as a NET-VISA scanner in addition to the GA scanner since January 2018.
- NET-VISA also produces VSEL3 in parallel, which uses the same detections as SEL3.



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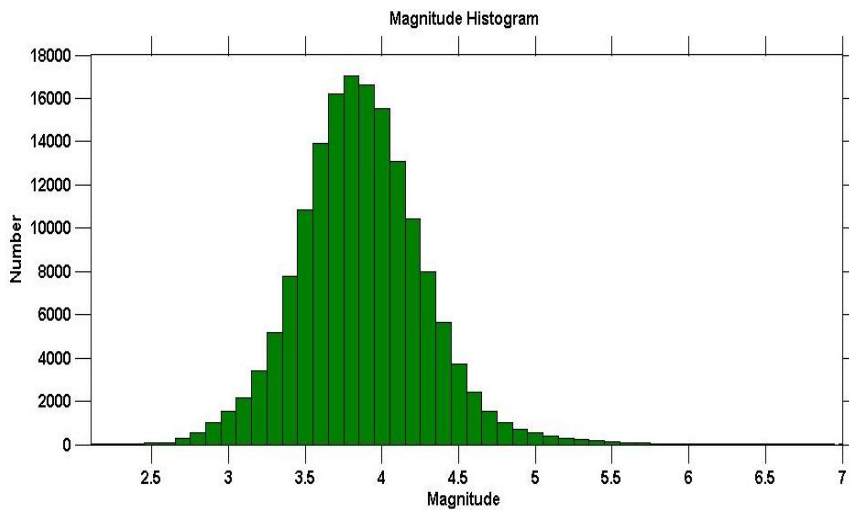
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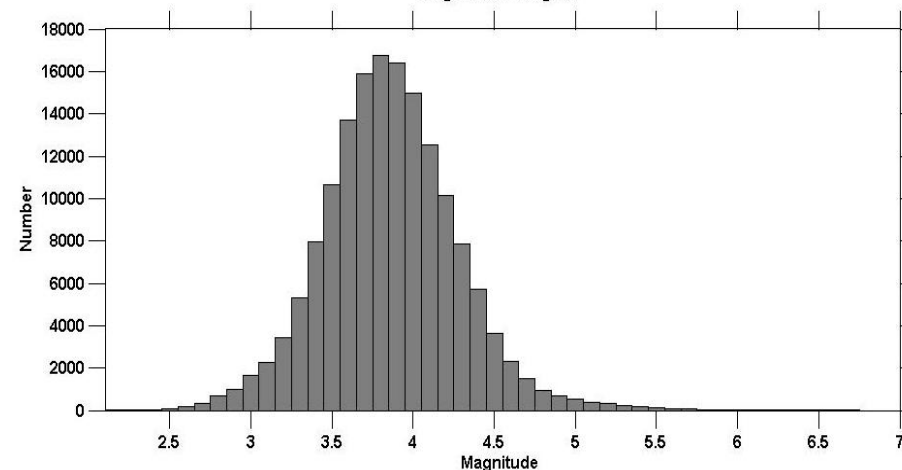
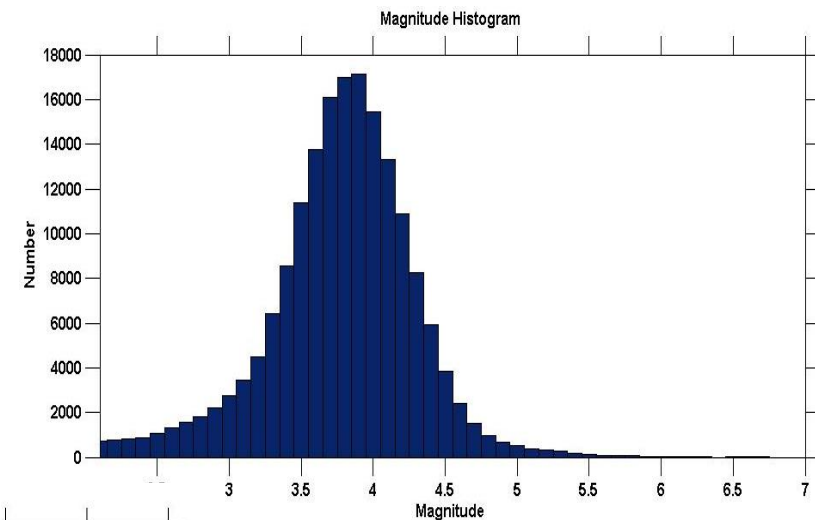
# Objectives

- We used three distinct time periods, each including 1200 days, two before and one after the NET-VISA scanner implementation to evaluate the NET-VISA performance as well as to exclude the effect of other possible factors, such as global seismicity and network performance.



- Period 1 from 2012-2014

- Period 2 from 2015-2018



- Period 3 from 2018-2021



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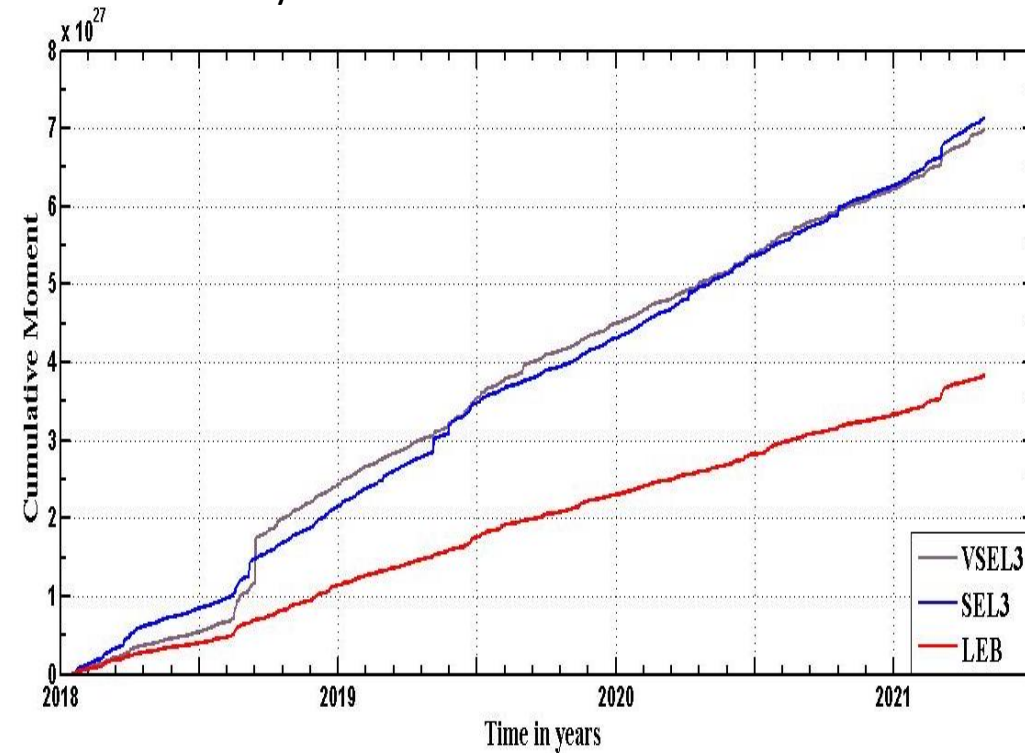
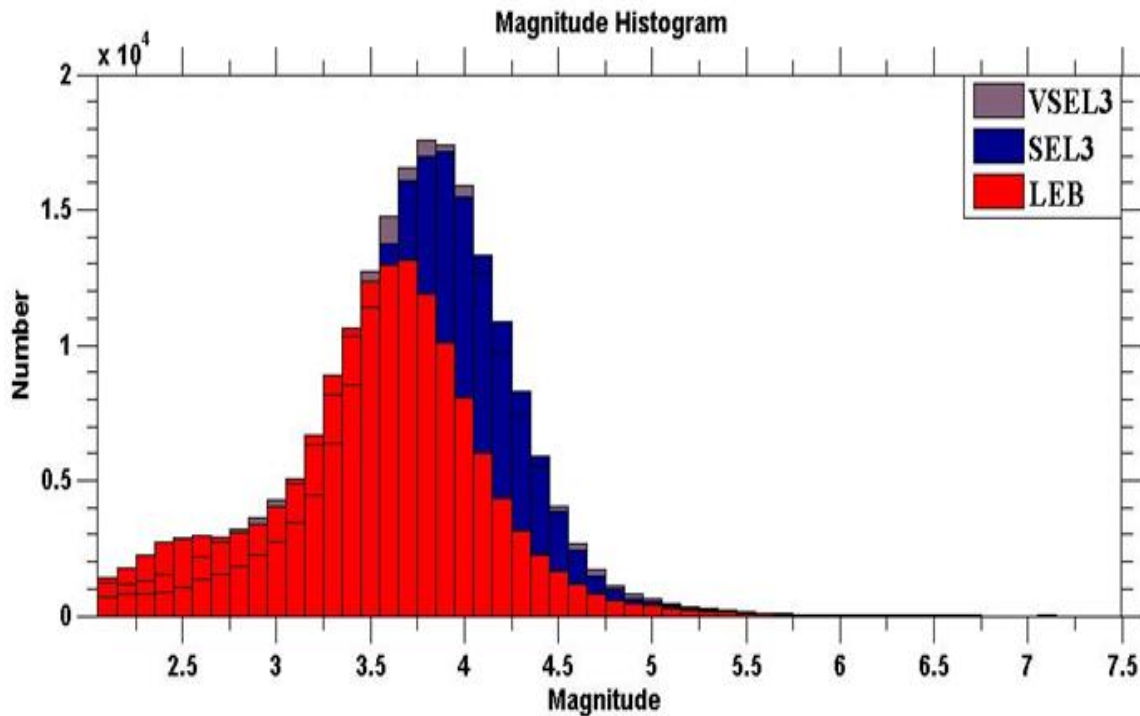
CONCLUSION



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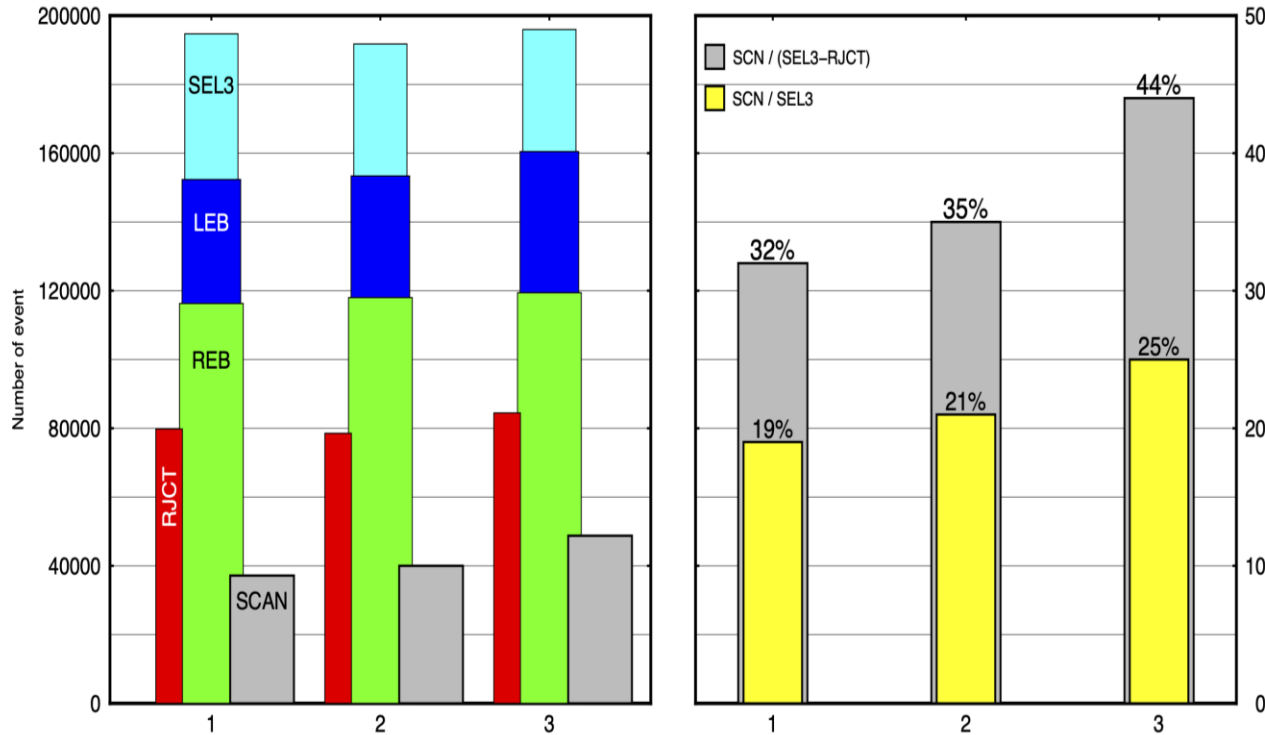
The Network Processing Vertically Integrated Seismic Analysis (NET-VISA) is a Bayesian seismic monitoring system designed to process IMS data to reduce the number of missed and false events in the automatic processing. In this study, we assess the effect of the NET-VISA automatic scanner on the number of events in the IDC bulletins. In particular, the impact of the NET-VISA scanner on the number of scanned events during the interactive analysis.



Number of VSEL3 events is slightly higher than SEL3 events, especially for moderate magnitude events between 3.5 and 5.

Cumulative number of events since 2018

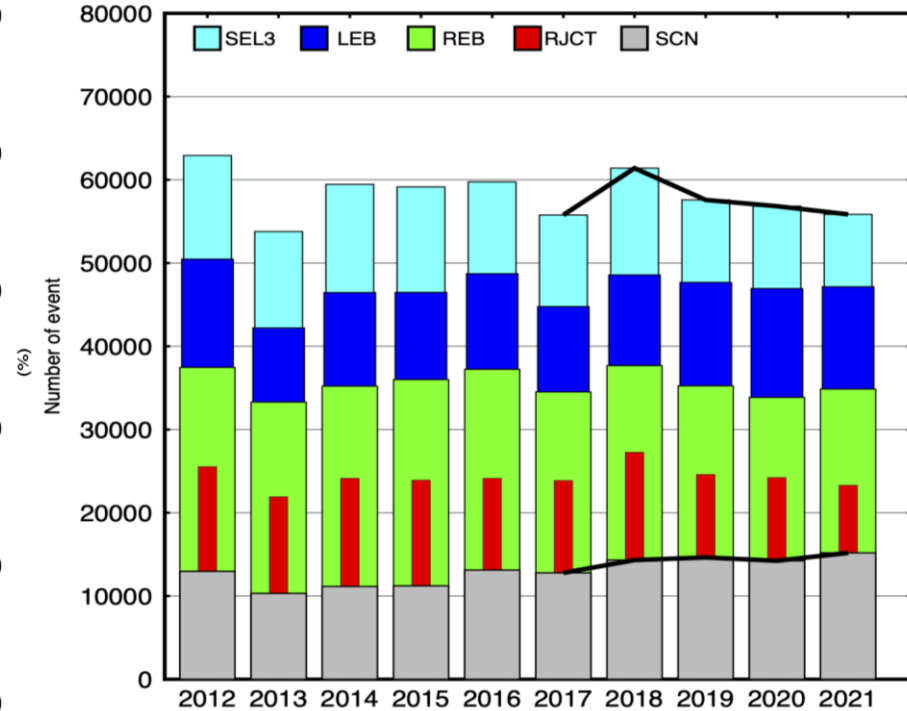
## Comparison of the number of events for the three assessed periods



SEL3: automatically produced list of event  
 LEB: Late Event Bulletin  
 REB: Reviewed Event Bulletin  
 SCN: Scanned Events  
 RJCT: Rejected Events

The increase in the scanned events in the 3<sup>rd</sup> period is notable.

## Yearly comparison of the number of events, 2012-2021



- Number of SEL3 from 2018 to 2021 is slightly decreasing -> Due to lower seismicity
- Not the case for REB and LEB especially for Scanned events (SCN)!
- We relate this to the implementation of the Net-VISA scanner in 2018



## Conclusion

- Comparison between the different bulletins shows that the NET-VISA scanner helps to build more valid events during the interactive analysis.
- The results show about a 4.6% increase in the number of LEB events after including the NET-VISA scanner in operation, with an average of 7 events per day, and a notable increase of 17.90% in the number of scanned events.

## Recommendation

- Swapping between GA and NET-VISA would be beneficial for the interactive analysis in order to review the SEL3 bulletin based on NET-VISA and could help to increase the number of valid events and reduce the scanning time.



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