







Investigation of the pre-eruptive processes of the 2014/15 Holuhraun eruption based on extracted volcanic tremor signals

Zahra Zali, Eva P. S. Eibl, Matthias Ohrnberger, Frank Scherbaum

### **Motivation**

- ✓ Volcanic tremors source location in the 2014/15 Holuhraun eruption
- $\checkmark$  decrease the uncertainty in the cauldrons formation date
- ✓ Timing the subglacial eruptions
- Investigation on the pre-eruptive tremors as eruption precursors

### **Method**

Volcanic Tremor Extraction and Small Earthquakes Detection using Music Information Retrieval Algorithms



#### From Zali et al. (in review)

# The preliminary result



We extract the volcanic tremor signal from the seismic waveform (Zali et al. (under review) SRL)



**Discussion** 



The root mean square (RMS) of the extracted tremor signals and the root median square (RMeS) of the filtered seismic data (from Eibl et al. 2017a) are shown in (a) and (b) respectively.

Before this study the tremor strength was defined based on long time windows and Root Median Square. This is not sensitive to earthquake if there are a few earthquakes. But if there are a lot of earthquakes the RMS amplitude will be affected by them as we can see in subfigure (b). But the RMS of the extracted tremor signal is only based on the tremor amplitude (a) so it is more reliable.

## Outlook

- Extracting the tremor signal allows a better study of the signal properties, amplitude and source location
- ✓ This study may help to answer some of the open questions about the processes during the 2014/15 Holuhraun eruption such as caldera subsidence and subglacial eruptions
- Investigation on the pre-eruptive tremors could improve the eruption forecasting researches