

Overview of the shallow magma reservoir, conduit properties and effusion style throughout the 2021 eruption near Fagradalsfjall, Iceland

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21 March 2021

View from S
Vent 1



Photo credit: Volcano Heli

25 April 2021

View from NW
Vent 6 Vent 3 Vent 5 Vent 1



Sarah Lindenlaub

2 May 2021

View from SE
Vent 5



Volcano Heli (www.vh.is)

8 June 2021

View from S
Vent 5



Volcano Heli (www.vh.is)

21 August 2021

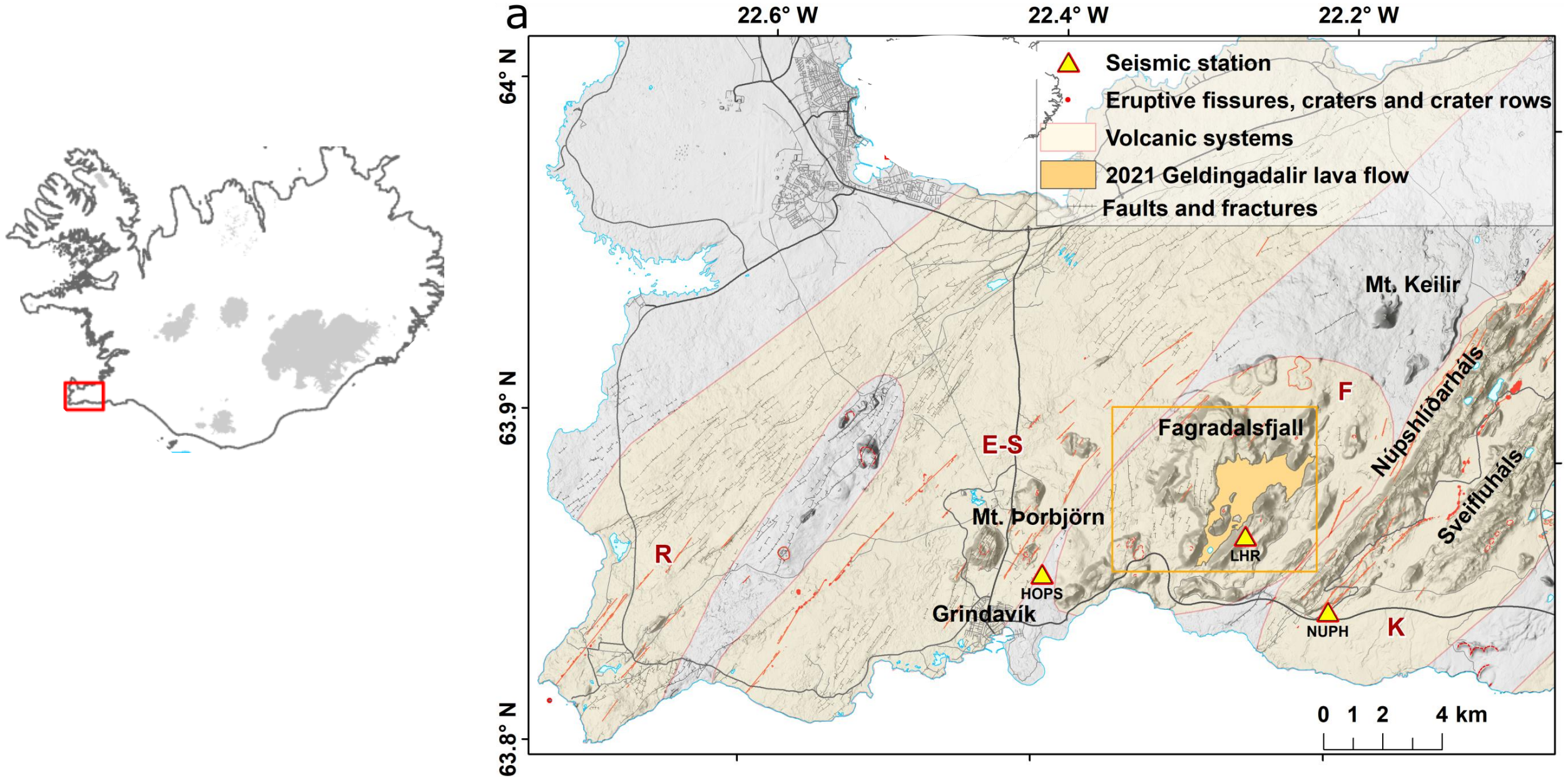


Eibl et al. (2023) Bull. Volc.

Eibl, E. P. S., et al. (2023) Evolving Shallow conduit Revealed by Tremor and Vent Activity Observations during Episodic Lava Fountaining of the 2021 Geldingadalir Eruption, Iceland, *Bulletin of Volcanology* 85, 10, DOI: 10.1007/s00445-022-01622-z

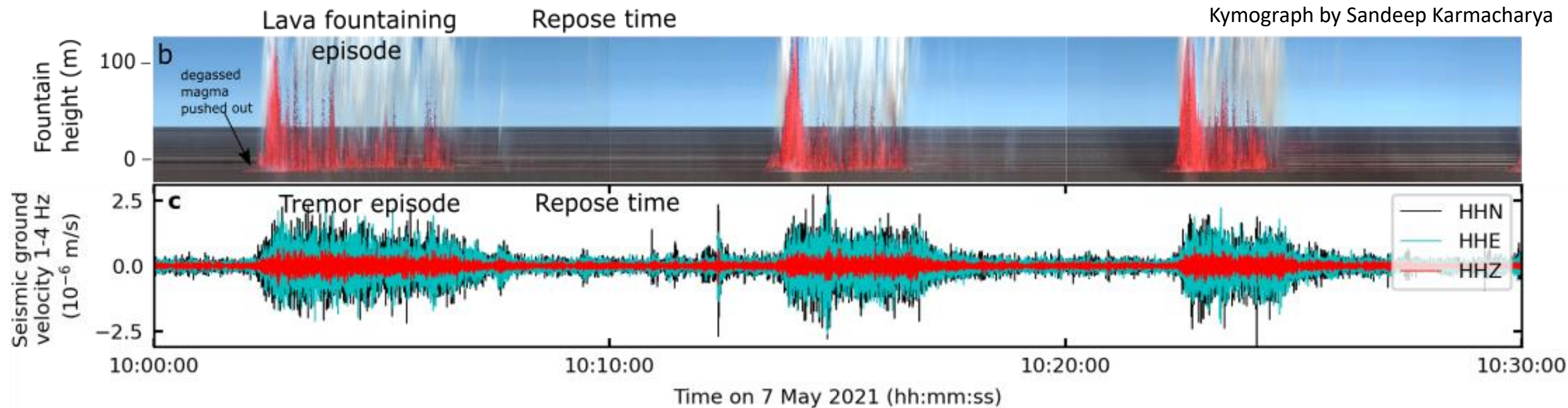
Eibl, E. P. S., et al. (*in review at JGR*) Illuminating the Transition from an open to a semi-closed volcanic vent system through episodic tremor duration and shape

Seismic stations near the Geldingadalir 2021 eruption



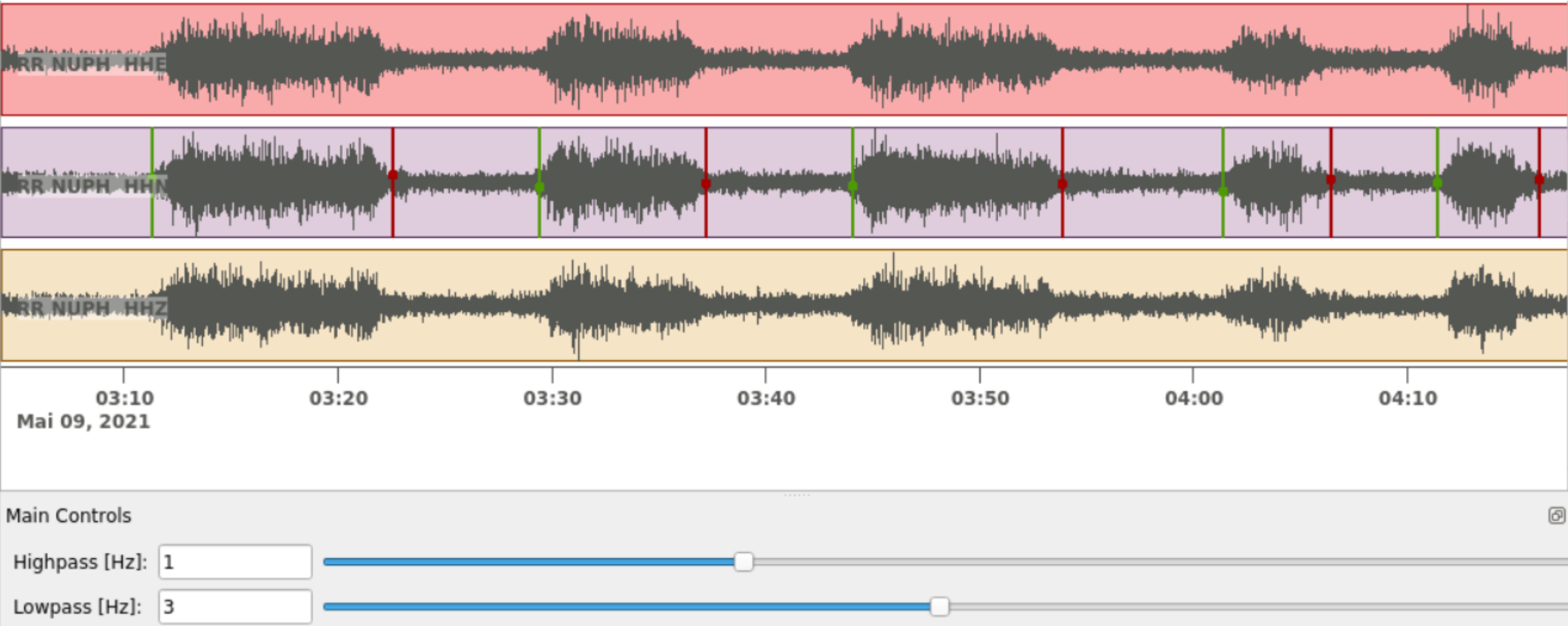
Eibl et al. in review

Times of lava effusion and volcanic tremor align



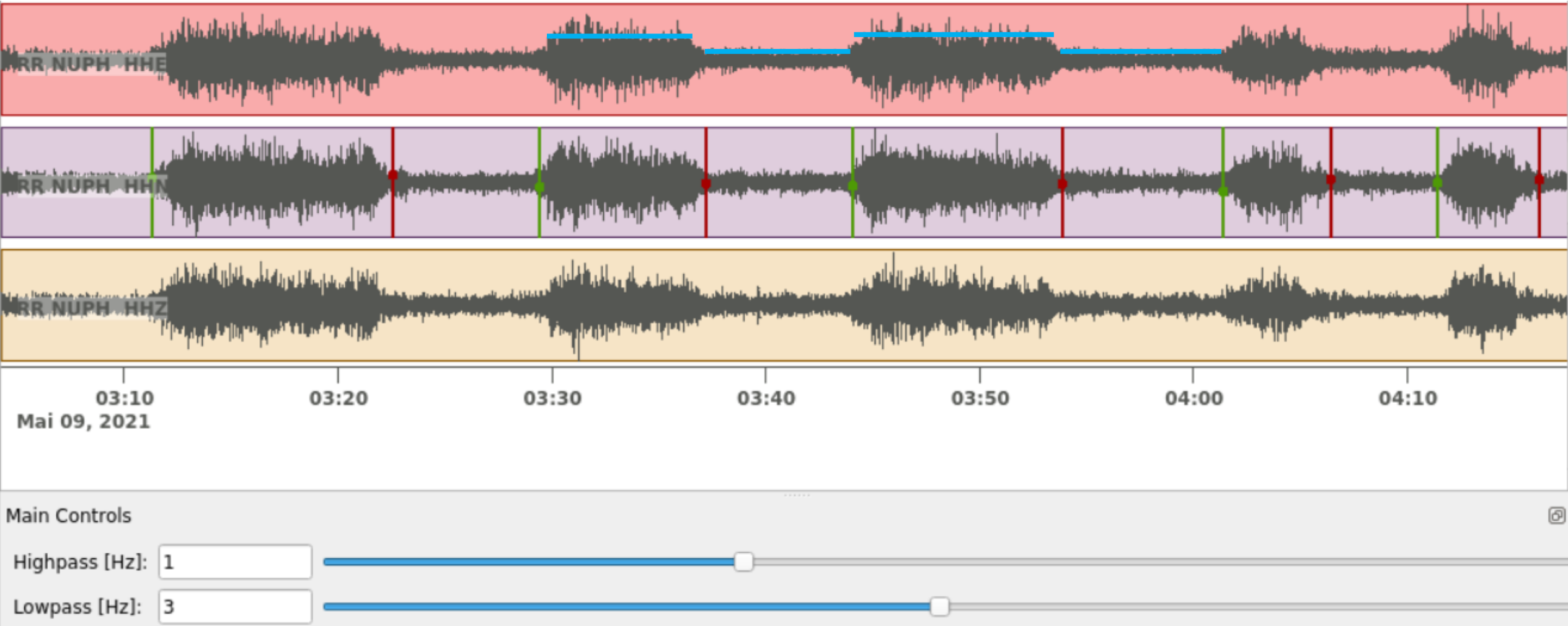
Eibl et al. (2023) Bull. Volc.

We mark the start and end of 8 696 tremor episodes

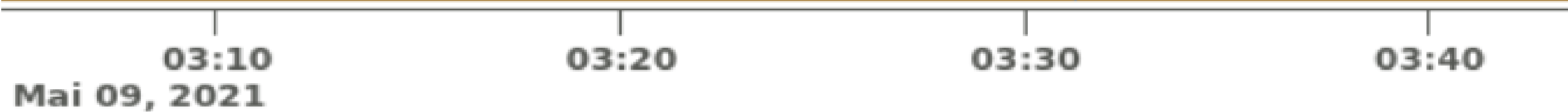
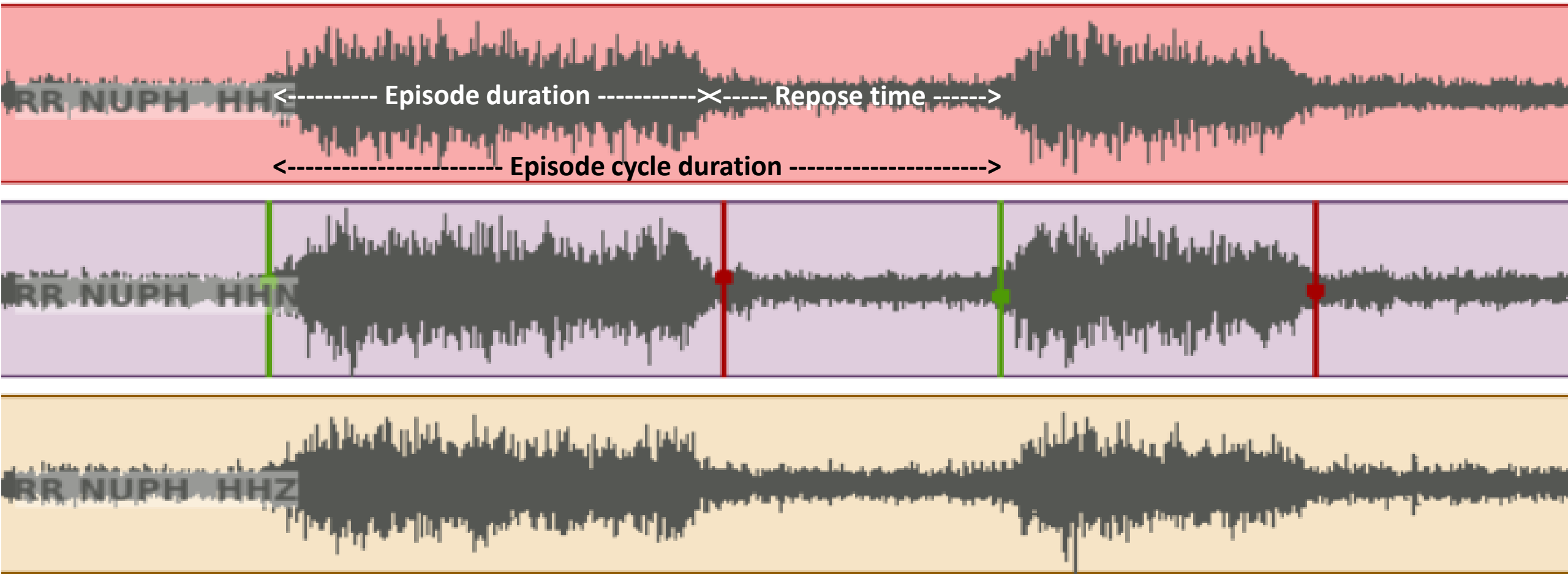


Marked by Eva Eibl, Alea Joachim, Undine Gnauck, Shaig Hamzaliyev @ UP

We calculate the mean tremor amplitude between the markers

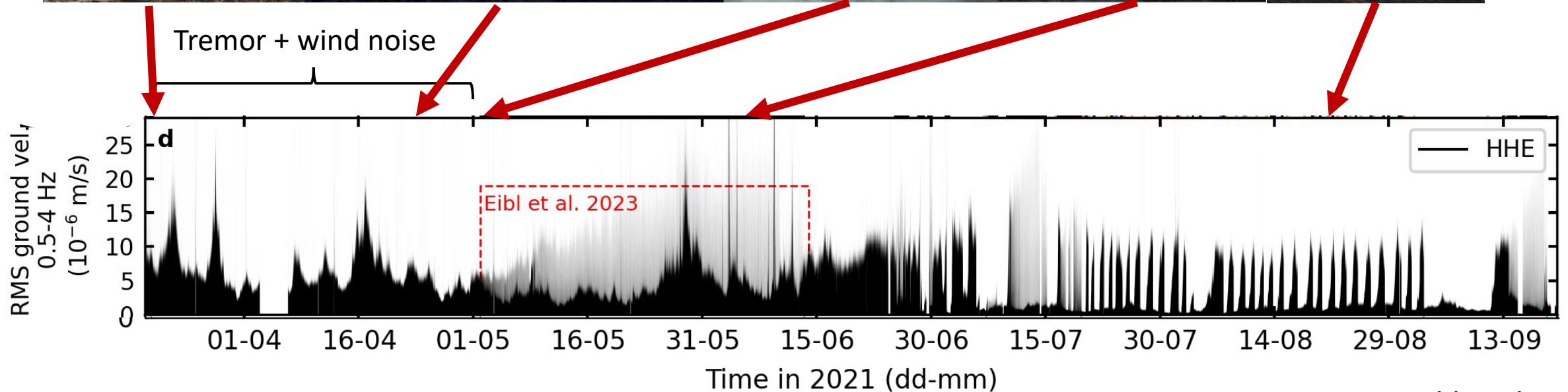


Definition of episode duration, cycle duration & repose time



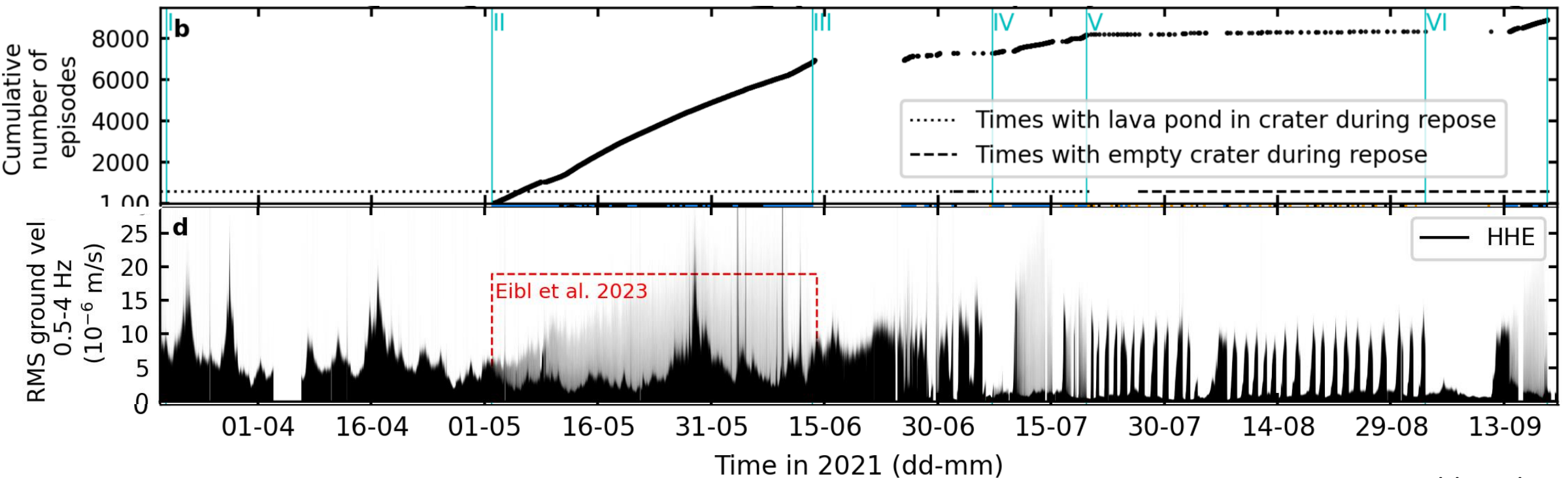
The generated tremor patterns are diverse

Eibl et al. (2023) Bull. Volc.



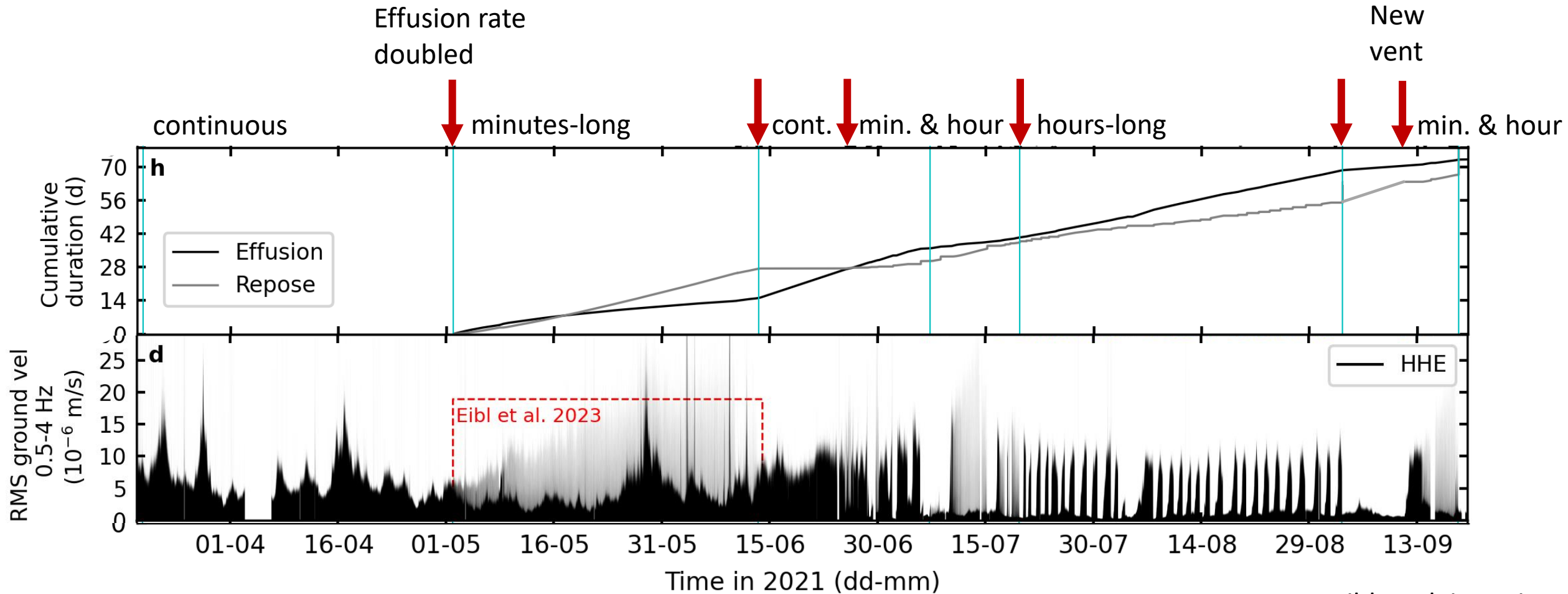
Eibl et al. in review

We define 6 phases during the Geldingadalir eruption 2021



Eibl et al. in review

Transitions between states



Eibl et al. in review

Possible trigger: 11 July collapse event

<https://www.youtube.com/watch?v=OEXI9wIV1Cc>

10 July 13:40

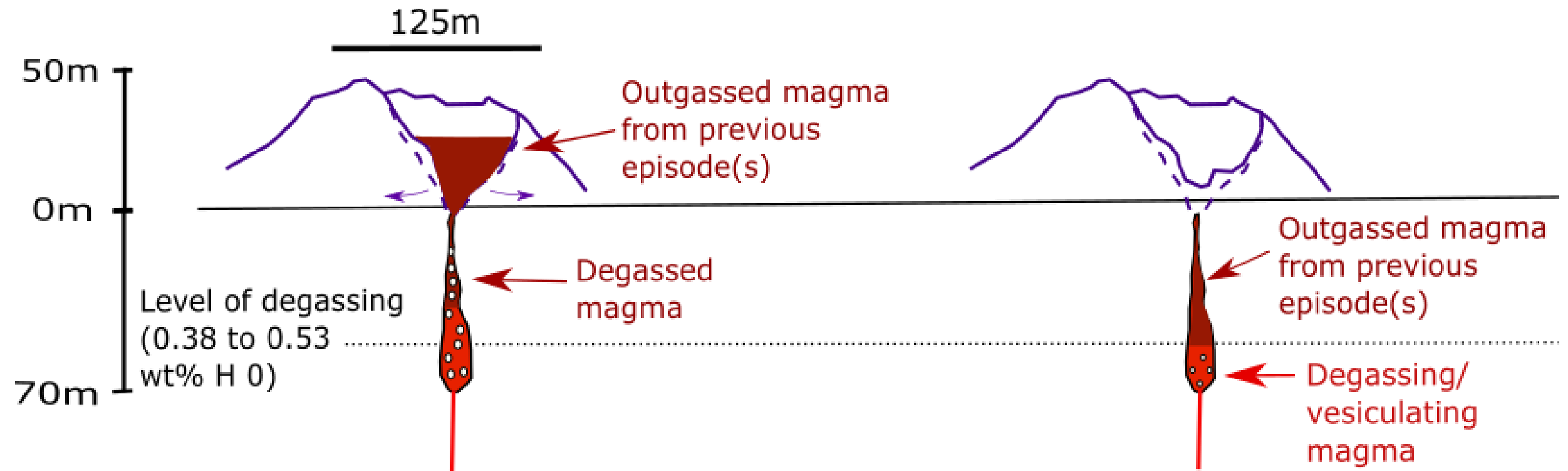
13 July 10:10



Minutes and hour-long episodes reflect different system states

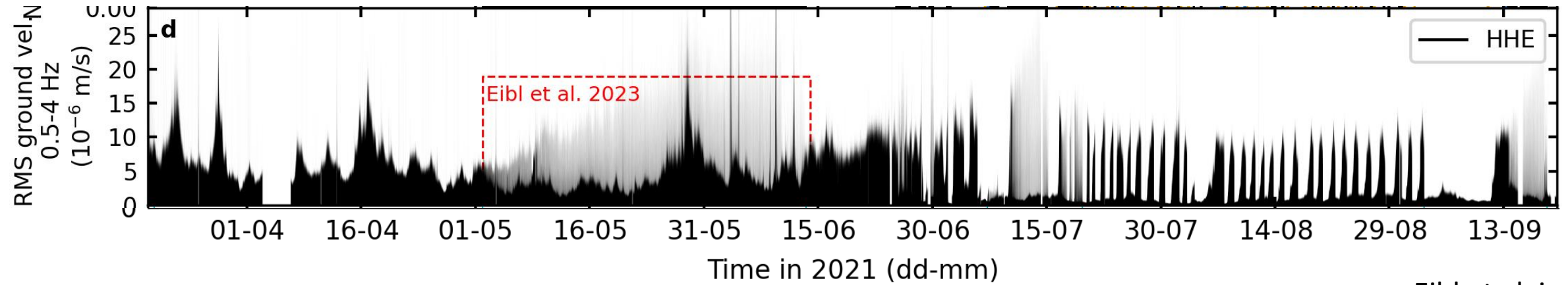
a) repose time minute-long episodes

b) repose time hour-long episodes



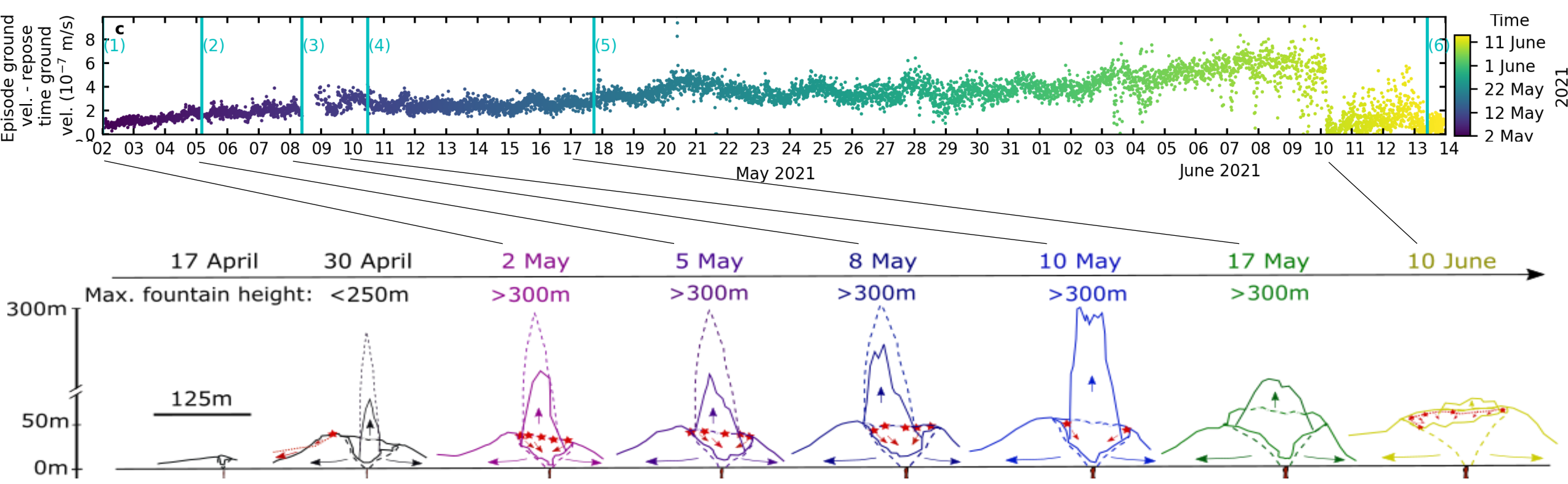
Eibl et al. in review

Let's zoom into May – mid June



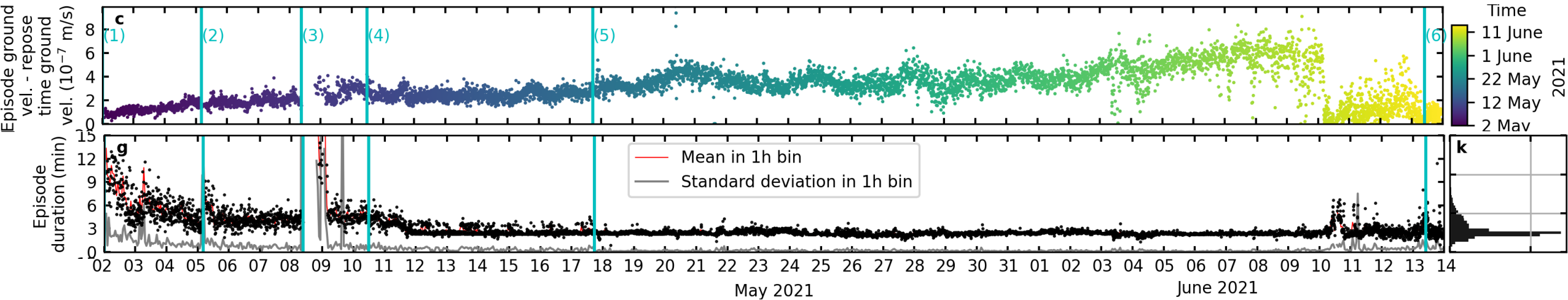
Eibl et al. in review

Seismic amplitude & fountain height decrease linked to mechanical erosion of vent & its size increase



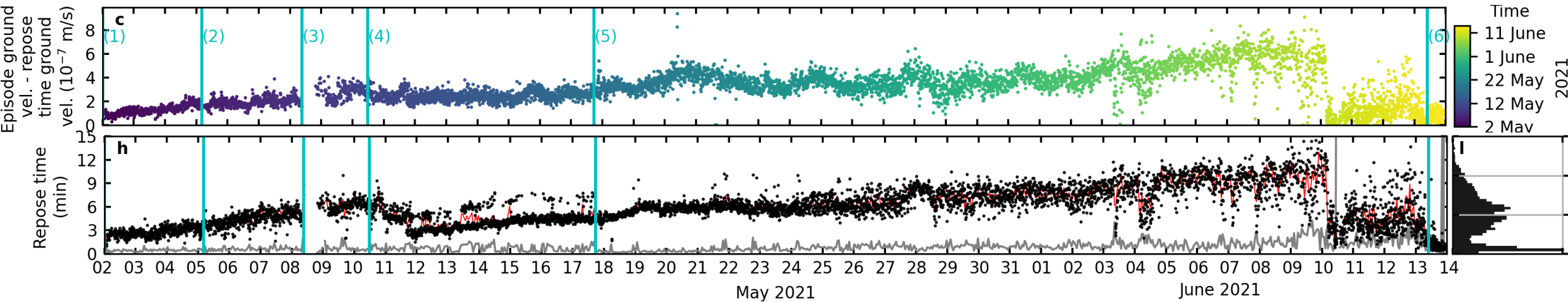
Eibl et al. (2023) Bull. Volc.

Episode duration indicates a growing, shallow magma compartment from 2 to 11 May



Eibl et al. (2023) Bull. Volc.

Rest time linked to viscosity & amount of degassed magma at the bottom of the crater



Eibl et al. (2023) Bull. Volc.

Summary



- We interpret the **seismic amplitude** in the context of the **size of the vent**.
- We interpret the **episode duration** in the context of the **size of the magma compartment**.
- We interpret the **repose time** in the context of the **accumulated outgassed material** in the crater.
- Minute-long and hour-long episodes reflect open vent system and semi-closed vent system.

Photo credit: www.vh.is