

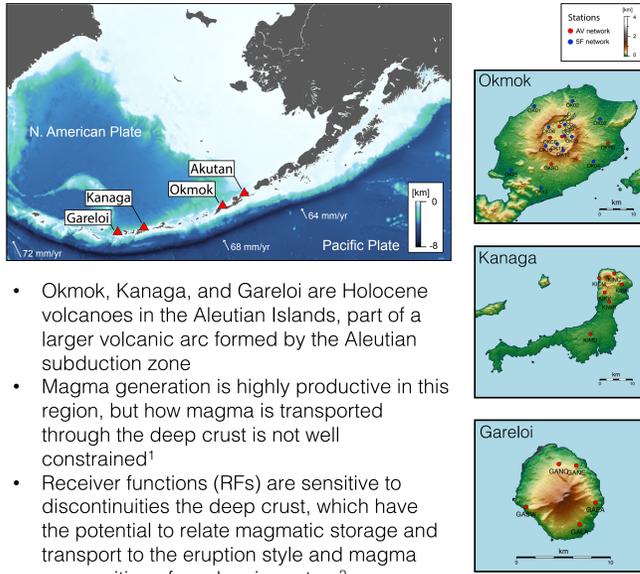
# Using receiver functions to image magmatic plumbing structure beneath Okmok volcano

Madeleine Tan<sup>1</sup>, Helen Janiszewski<sup>2</sup>, Jeroen Ritsema<sup>1</sup> | <sup>1</sup>University of Michigan, <sup>2</sup>University of Hawai'i at Mānoa



Abstract ID: 875425  
mmtan@umich.edu

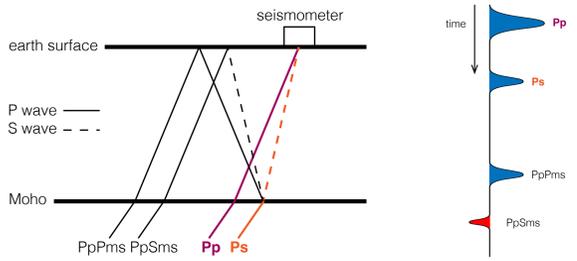
## 1. Summary



- Okmok, Kanaga, and Gareloi are Holocene volcanoes in the Aleutian Islands, part of a larger volcanic arc formed by the Aleutian subduction zone
- Magma generation is highly productive in this region, but how magma is transported through the deep crust is not well constrained<sup>1</sup>
- Receiver functions (RFs) are sensitive to discontinuities in the deep crust, which have the potential to relate magmatic storage and transport to the eruption style and magma composition of a volcanic system<sup>2</sup>

- For all three volcanoes, there are differences between ray paths of RFs that sample the volcanic edifice, and ray paths that do not
- At Kanaga and Gareloi, RFs look similar between stations
- At Okmok, RFs vary between stations, indicating there is complex localized structure at Okmok

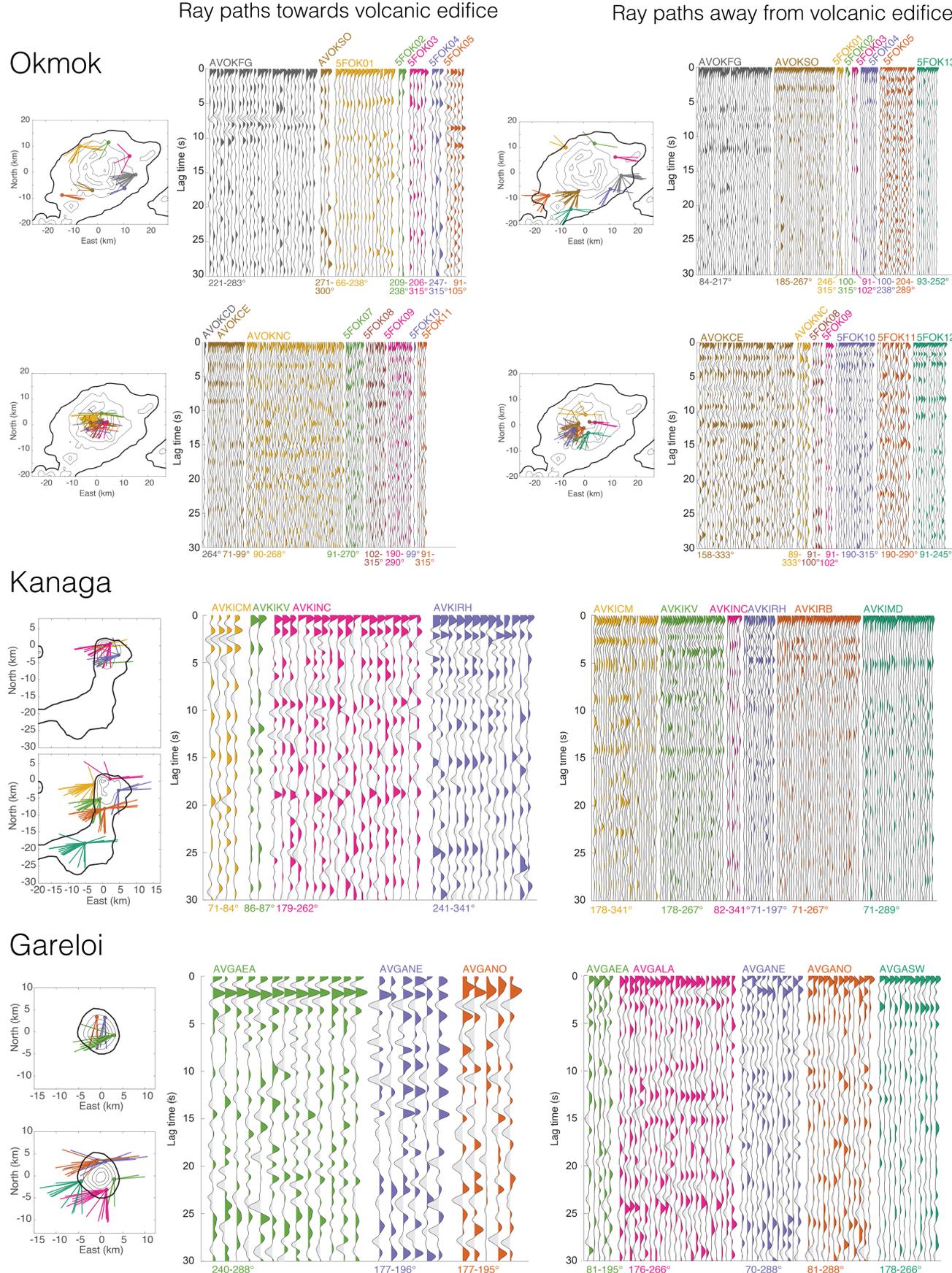
## 2. Methods and data



- RFs are derived from deconvolving the vertical component from the radial or transverse component<sup>3</sup>
- RFs are sensitive to velocity contrasts at boundaries, which affects signal polarity<sup>4</sup>. The time difference between Ps and P can give a Moho depth estimate<sup>5</sup>
- We use P-wave arrivals from  $\geq M6.5$  teleseismic earthquakes to calculate radial RFs. At Okmok, we also include P-wave arrivals for  $M6 - 6.5$  and PP-wave arrivals for  $\geq M6.5$  events
- We visually inspect RFs and discard those with negative arrivals or long, low amplitude signals

Volcano	Network	Data range	Total RFs after quality control	RFs per station after quality control
Okmok	AV; 5F	2008-2021	383	2-103
Kanaga	AV	2019-2021	120	12-26
Gareloi	AV	2019-2021	121	21-26

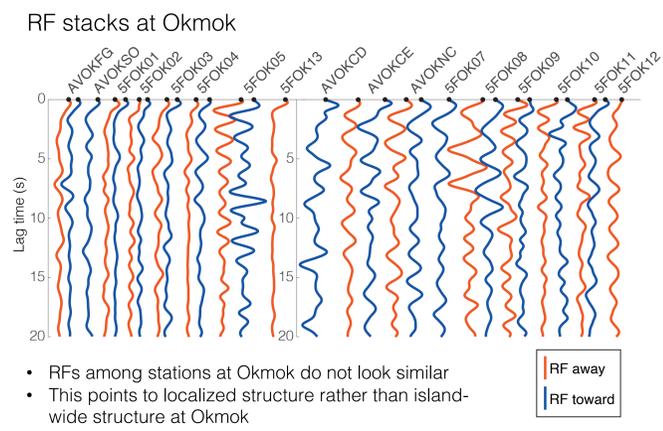
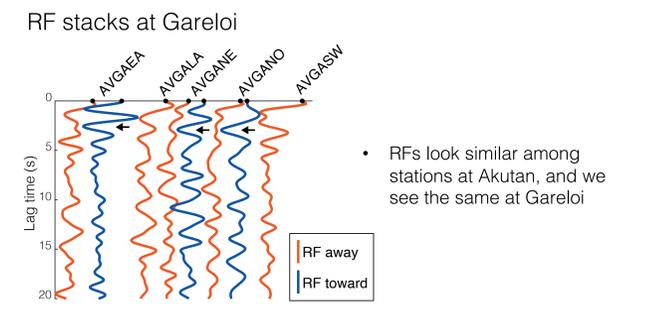
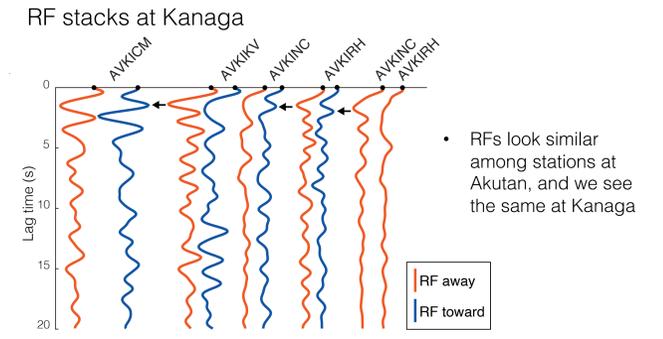
## 3. Results



## 4. Discussion

Previous study at Akutan by Janiszewski et al. 2013

- RF stacks at Akutan show similar results of bimodal differences
- Back-azimuth ranges pointing towards the volcano showed evidence of a mid-crustal LVZ, while back-azimuth ranges pointing away do not
- Janiszewski et al. find this is due to a magma body that sits below much of the island<sup>6</sup>



## References and Acknowledgements

Data downloaded from IRIS<sup>7</sup>, courtesy of Alaska Volcano Observatory<sup>8</sup> (<https://doi.org/10.7914/SN/AV>) and 5F network<sup>9</sup> ([https://doi.org/10.7914/SN/5F\\_2015](https://doi.org/10.7914/SN/5F_2015))

To access a full references page, please scan the QR code

I would like to thank Dr. Helen Janiszewski for her support, guidance, and expertise with this project!

