

# Solutions — Introduction to the GEOROC database

## Exercise 1:

Locality: ICELAND / ICELAND / ASKJA

This query returns basalt samples from Askja volcano on Iceland. Ages range from 1.2–700 kyr. The Fractionation correction values used in the determination of isotopic ratios are 0.1194 for  $^{86}\text{Sr}/^{88}\text{Sr}$  and 0.7219 for  $^{146}\text{Nd}/^{144}\text{Nd}$ .

## Exercise 2:

Using a geographical region of Latitude 57–72° and Longitude 3.5–32°, the distribution looks like Fig. 1. Note that this region will also contain rocks from other countries. When examining this distribution, remember that plutonic data has only been added to the GEOROC database relatively recently. Plutonic ages are, therefore, likely underrepresented.

## Exercise 3:

Query by Chemistry (Abundances) and use the OR operator on the REEs to obtain all analyses, even if not every element was measured in each analysis. 997 out of 2279 analyses within this compilation, or 44%, report values for all rare earth elements.

## Exercise 4:

Query by Petrography (volcanic rocks). Use the Compiled option to get a single value for each element per analysis. Note you will need to do some post-processing of the file to get a clean dataset without blanks or zero-values. The Ba/La averaged over 15,580 samples is 53. Do you trust this value?



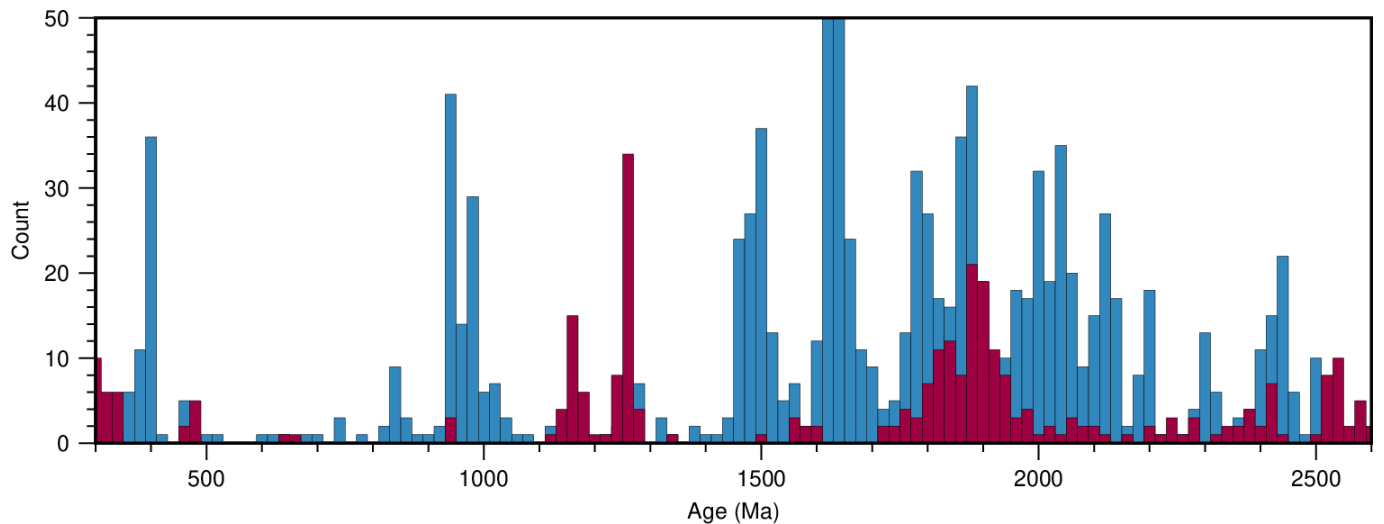


Figure 1: Volcanic (red) and plutonic (blue)  $^{207}\text{Pb}/^{206}\text{Pb}$  ages for Norway/Scandinavia, in 20 million year (Ma) bins.

Alternatively, to calculate the Ba/La of rhyolites you could query by rock name (rather than chemistry), which will obviously give a different result. Given the large number of samples covered in this query, you may want to download the precompiled files for rhyolite instead.

### Exercise 5:

Query by Petrography. The majority of analyses come from the Udachnaya and Bultfontein kimberlite pipes.

Localities: SIBERIAN TRAPS / YAKUTIAN KIMBERLITE FIELDS / UDACHNAYA KIMBERLITE and KAAPVAAL CRATON\_MESOZOIC / SOUTH AFRICA / KIMBERLEY KIMBERLITE PROVINCE / BULTFONTEIN KIMBERLITE

### Exercise 6:

Your TAS diagram should look something like Fig. 2. Notice that basalts spill over into the field for basaltic andesite; and some of the rhyolites plot in the dacite field. There are very few intermediate compositions (andesites). Analyses with rock name NOT GIVEN are predominantly rhyolites with some more mafic compositions. Olivine-hosted melt inclusions overlap closely with whole-rock analyses of basalt.



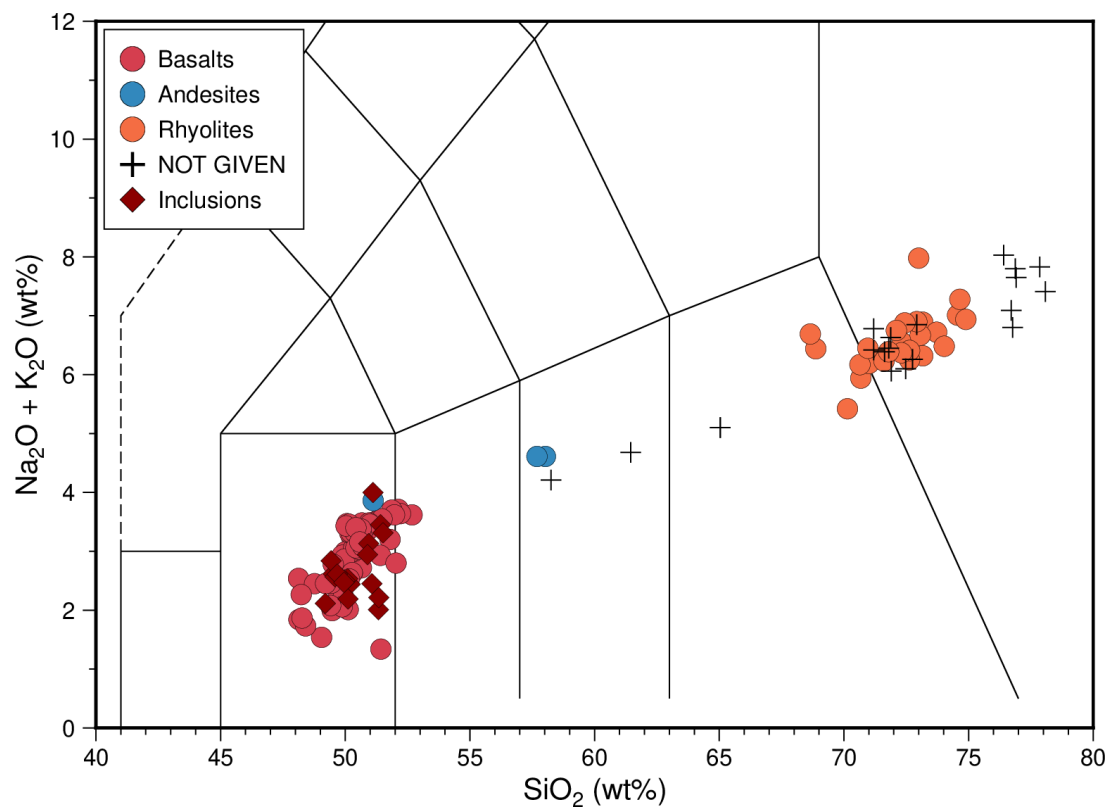


Figure 2: TAS diagram for whole-rock and melt inclusion analyses from Askja, Iceland.