

An updated overview of the geochemistry of Teide-Pico Viejo volcanic complex (Tenerife island, Spain)

Olaya Dorado^{1,2}, Joan Martí¹, John Wolff³ and
Adelina Geyer¹

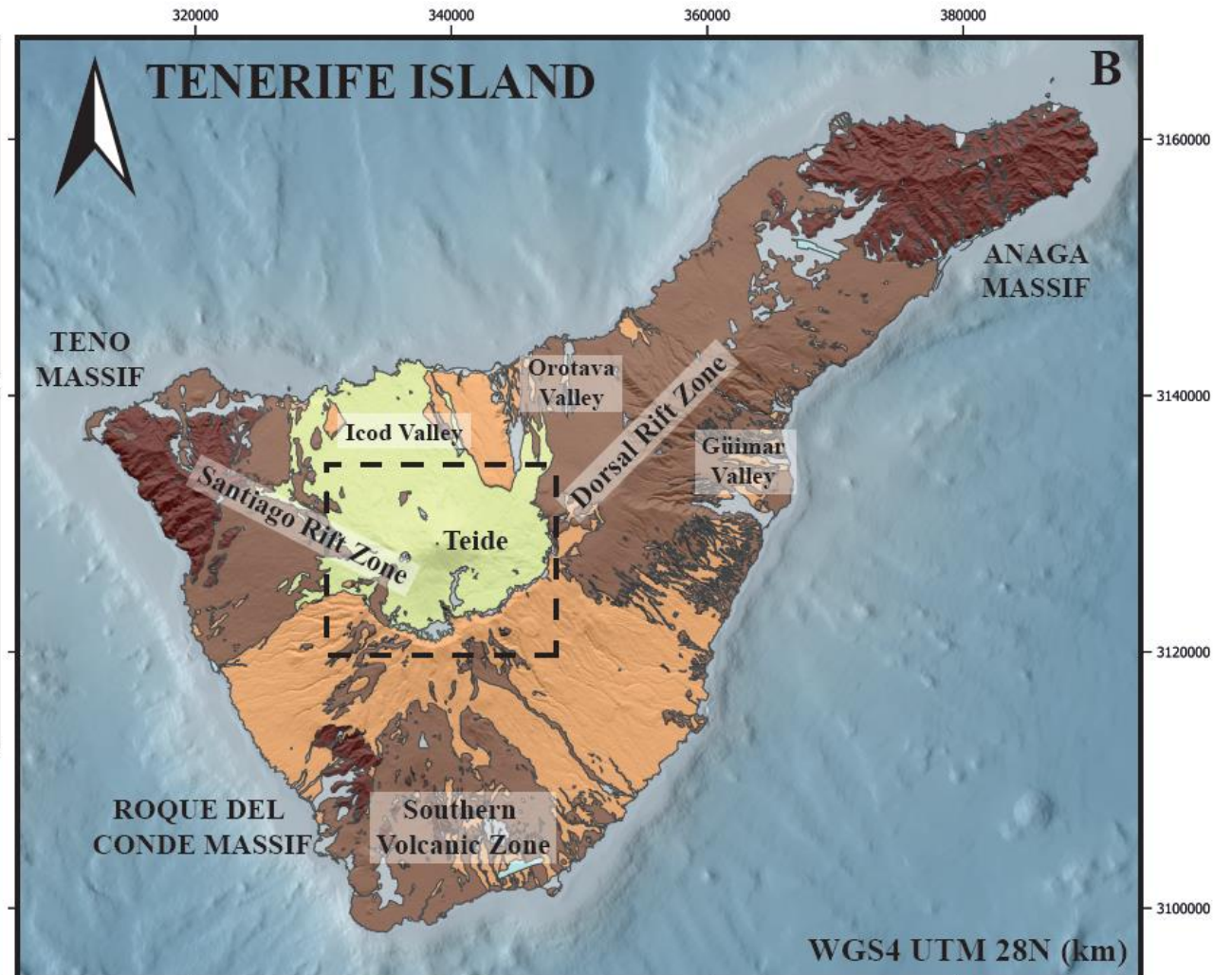
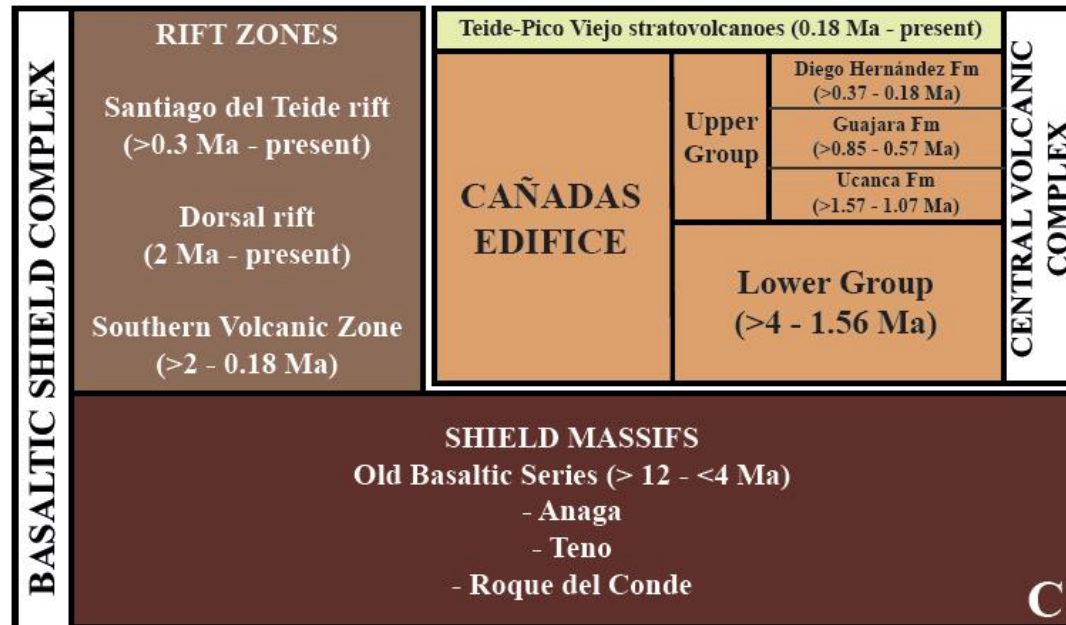
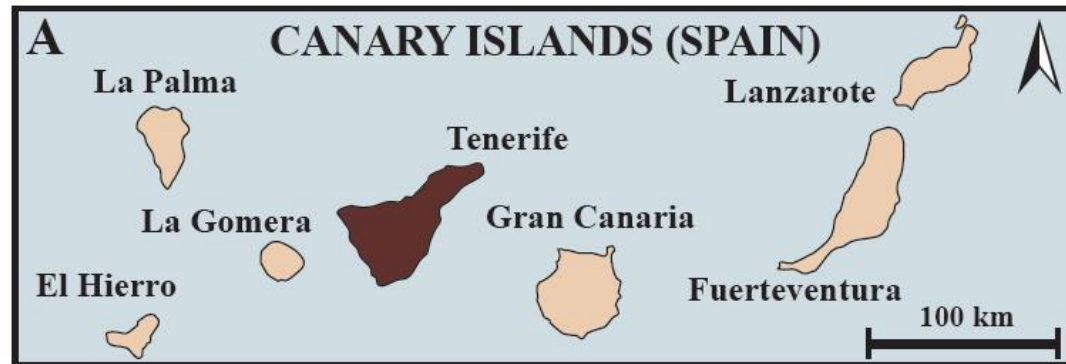
¹Geosciences Barcelona (GEO3BCN-CSIC).

²Facultat de Ciències de la Terra, Universitat de Barcelona.

³School of the Environment, Washington State University.



Tenerife island

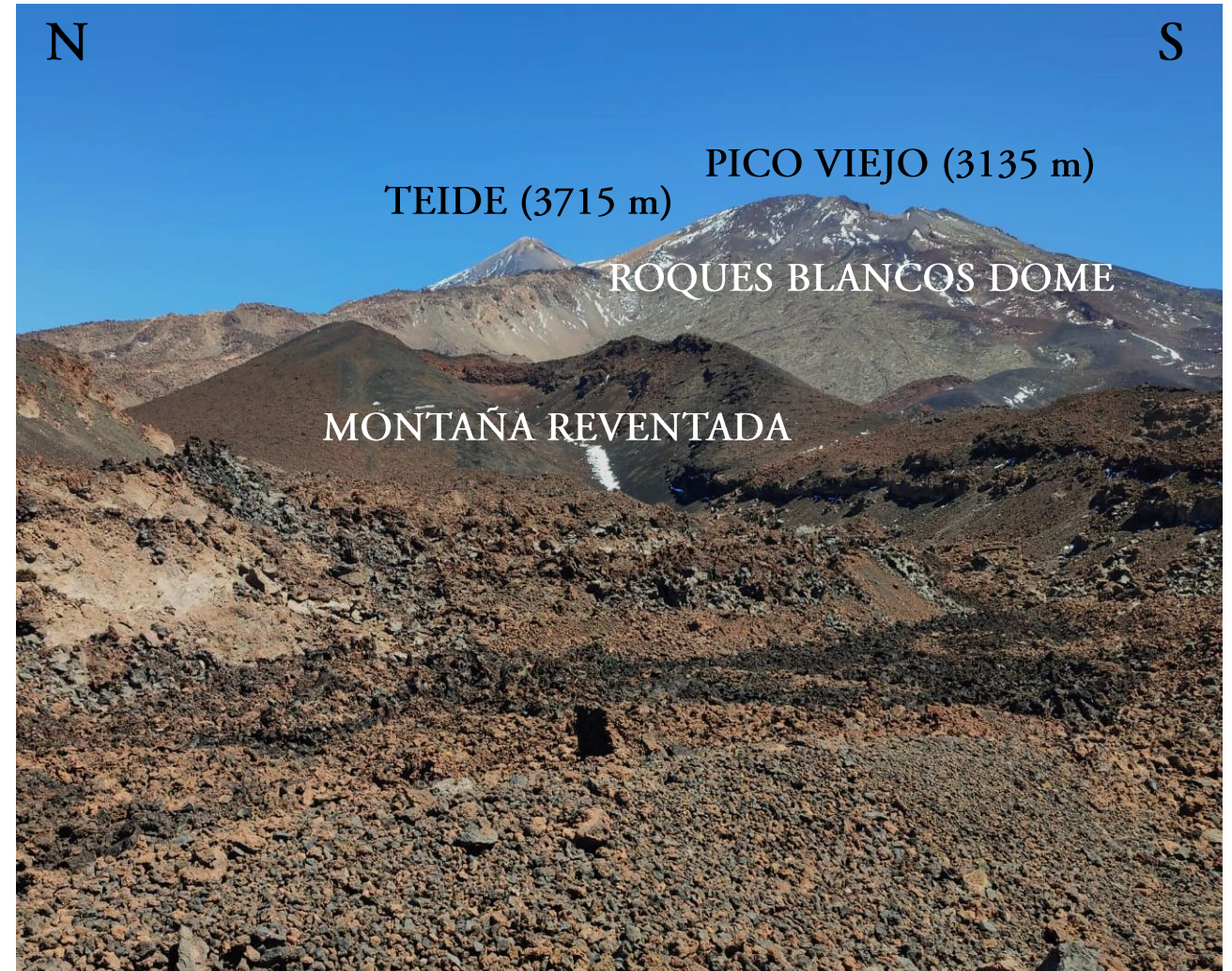


Teide-Pico Viejo volcanic complex

eruptive phases	Santiago rift	Pico Viejo	Pico Teide	east/central LCC /Dors. rift
10. Historic	MChahor. 1798		PT L 1380	
9. Young felsic activity 1-3 ka	M. Revent. rev1 1 ka rev2		PT K	2 ka Upper MB Lower MB
8. PT J hybrid eruption			PT J J1 J2	
7. PV caldera-fill	M. Ciego	PV J J1 J2 PV I		
6. PT felsic flank vents				M. Corrales M. Abejera Pico Cabras Roq. Blancos Hoy. Cedro M. Majua/L.R. M. de la Cruz Ar. Blancas 15 ka M. Mostaza M. Conejos Bocas Marie M. las Lajas
5. PV rejuvenation	Cuevas. Hielo	PV G PV F		
4. PT I hybrid eruption			>18 ka PT I	
3. Growth of PV	M. Chio/Bot. M.C. Tea/Sam Cuevas. Raton	PV E PV D PV C		V. Corona M. Negra M. Tomillos M. Tapada
2. Establishment of PV		PV B PV A	PT H	M. Ar. Negras M. Cerrilal baja
1. Growth of PT			PT G PT F PT E PT D PT C PT B PT A ?	M. Colmenar ? Siete Cañadas B Siete Cañadas A PT B ?

phonolite
 tephri-phonolite
 phono-tephrite
 plag. basanite
 basanite/alk. basalt

Ablay & Martí (2000)



Why Tenerife?

Central complex with **high explosive capacity** and long recurrence periods.

~ 1,000,000 inhabitants + tourists.

Problems

Dispersed and **out-of-date** petrological/geochemical information.

Difficult to relate available data with a **stratigraphy**.

Lack of a detailed understanding of the volcanic system.

HINDERS PROPER
HAZARD ASSESSMENT



Actions



Create a complete **Open Access** geochemical database for T-PV volcanic complex.

Aims

Evaluate the **representativeness** of available data.

Correlate data with an **updated** volcanic stratigraphy.

Shed light on the volcanic system (dating, magma evolution, timescales of magmatic processes...).

Why Tenerife?

Central complex with **high explosive capacity** and long recurrence periods.

~ 1,000,000 inhabitants + tourists.

Problems

Dispersed and **out-of-date** petrological/geochemical information.

Difficult to relate available data with a **stratigraphy**.

Lack of a detailed understanding of the volcanic system.

HINDERS PROPER
HAZARD ASSESSMENT



Actions



Create a complete **Open Access** geochemical database for T-PV volcanic complex.

Aims

Evaluate the **representativeness** of available data.

Correlate data with an **updated** volcanic stratigraphy.

Shed light on the volcanic system (dating, magma evolution, timescales of magmatic processes...).

Why Tenerife?

Central complex with **high explosive capacity** and long recurrence periods.

~ 1,000,000 inhabitants + tourists.

Problems

Dispersed and **out-of-date** petrological/geochemical information.

Difficult to relate available data with a **stratigraphy**.

Lack of a detailed understanding of the volcanic system.

HINDERS PROPER
HAZARD ASSESSMENT



Actions



Create a complete **Open Access** geochemical database for T-PV volcanic complex.

Aims

Evaluate the **representativeness** of available data.

Correlate data with an **updated** volcanic stratigraphy.

Shed light on the volcanic system (dating, magma evolution, timescales of magmatic processes...).

Why Tenerife?

Central complex with **high explosive capacity** and long recurrence periods.

~ 1,000,000 inhabitants + tourists.

Problems

Dispersed and **out-of-date** petrological/geochemical information.

Difficult to relate available data with a **stratigraphy**.

Lack of a detailed **understanding** of the volcanic system.

HINDERS PROPER
HAZARD ASSESSMENT



Actions



Create a complete **Open Access** geochemical database for T-PV volcanic complex.

Aims

Evaluate the **representativeness** of available data.

Correlate data with an **updated** volcanic stratigraphy.

Shed light on the volcanic system (dating, magma evolution, timescales of magmatic processes...).

Why Tenerife?

Central complex with **high explosive capacity** and long recurrence periods.

~ 1,000,000 inhabitants + tourists.

Problems

Dispersed and **out-of-date** petrological/geochemical information.

Difficult to relate available data with a **stratigraphy**.

Lack of a detailed **understanding** of the volcanic system.

**HINDERS PROPER
HAZARD ASSESSMENT**



Actions



Create a complete **Open Access** geochemical database for T-PV volcanic complex.

Aims

Evaluate the **representativeness** of available data.

Correlate data with an **updated** volcanic stratigraphy.

Shed light on the volcanic system (dating, magma evolution, timescales of magmatic processes...).

Why Tenerife?

Central complex with high explosive capacity and long recurrence periods.

~ 1,000,000 inhabitants + tourists.

Problems

Dispersed and out-of-date petrological/geochemical information.

Difficult to relate available data with a stratigraphy.

Lack of a detailed understanding of the volcanic system.

HINDERS PROPER
HAZARD ASSESSMENT



Actions



Create a complete Open Access geochemical database for T-PV volcanic complex.

Aims

Evaluate the representativeness of available data.

Correlate data with an updated volcanic stratigraphy.

Shed light on the volcanic system (dating, magma evolution, timescales of magmatic processes...).

Why Tenerife?

Central complex with high explosive capacity and long recurrence periods.

~ 1,000,000 inhabitants + tourists.

Problems

Dispersed and out-of-date petrological/geochemical information.

Difficult to relate available data with a stratigraphy.

Lack of a detailed understanding of the volcanic system.

HINDERS PROPER
HAZARD ASSESSMENT



Actions



Create a complete Open Access geochemical database for T-PV volcanic complex.

Aims

Evaluate the representativeness of available data.

Correlate data with an updated volcanic stratigraphy.

Shed light on the volcanic system (dating, magma evolution, timescales of magmatic processes...).

Why Tenerife?

Central complex with **high explosive capacity** and long recurrence periods.

~ 1,000,000 inhabitants + tourists.

Problems

Dispersed and **out-of-date** petrological/geochemical information.

Difficult to relate available data with a **stratigraphy**.

Lack of a detailed **understanding** of the volcanic system.

**HINDERS PROPER
HAZARD ASSESSMENT**



Actions



Create a complete **Open Access** geochemical database for T-PV volcanic complex.

Aims

Evaluate the **representativeness** of available data.

Correlate data with an **updated** volcanic stratigraphy.

Shed light on the volcanic system (dating, magma evolution, timescales of magmatic processes...).

Why Tenerife?

Central complex with **high explosive capacity** and long recurrence periods.

~ 1,000,000 inhabitants + tourists.

Problems

Dispersed and **out-of-date** petrological/geochemical information.

Difficult to relate available data with a **stratigraphy**.

Lack of a detailed **understanding** of the volcanic system.

**HINDERS PROPER
HAZARD ASSESSMENT**



Actions



Create a complete **Open Access** geochemical database for T-PV volcanic complex.

Aims

Evaluate the **representativeness** of available data.

Correlate data with an **updated** volcanic stratigraphy.

Shed light on the volcanic system (dating, magma evolution, timescales of magmatic processes...).

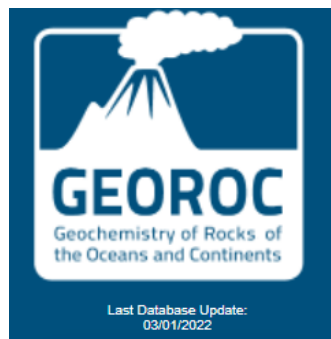
- Data homogenization and identification of geological units (if possible) and/or magmatic series.
- More than 30 references (for now!).
- 543 whole rock samples (85 geological units).
- 8474 mineral chemistry analysis (pyroxenes, olivines, feldspars, amphiboles, biotites, oxides and apatites) and 217 glass/groundmass analyses.

New data

79 samples (all outcropping units).

Whole rock (ICP-MS and XRF) and mineral chemistry (EPMA and LA-ICP-MS) performed in the Peter Hooper GeoAnalytical Lab (Washington State University).

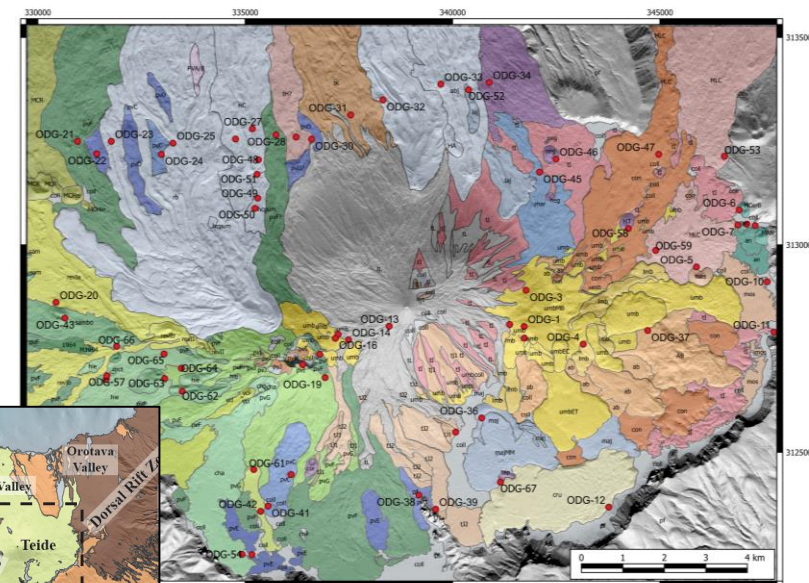
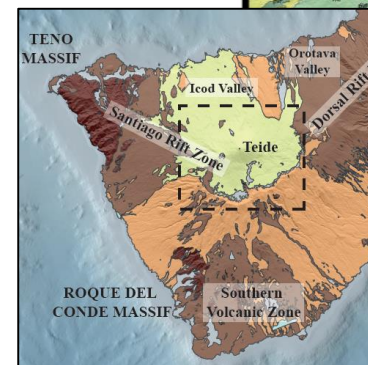
DATABASE



Review of the analysis available in **GEOROC** (Geochemistry of Rocks of the Oceans and Continents) database.

Filter by “Geological Setting” – Ocean Island – Canary Island – Tenerife: 4809 results.

Manual data filtering



Data collection in tables, supplementary materials and/or annexes.

Evidence for Fractional Crystallization of Periodically Refilled Magma Chambers in Tenerife, Canary Islands

E.-R. NEUMANN^{1*}, E. WULFF-PEDERSEN¹, S. L. SIMONSEN¹, N. J. PEARSON², J. MARTI³ AND J. MITJAVILA³

¹MINERALOGISK-GEOLOGISK MUSEUM, UNIVERSITY OF OSLO, SARGST. 1, N-4962 OSLO, NORWAY

²GEMOC, SCHOOL OF EARTH SCIENCES, MACQUARIE UNIVERSITY, SYDNEY, N.S.W. 2109, AUSTRALIA

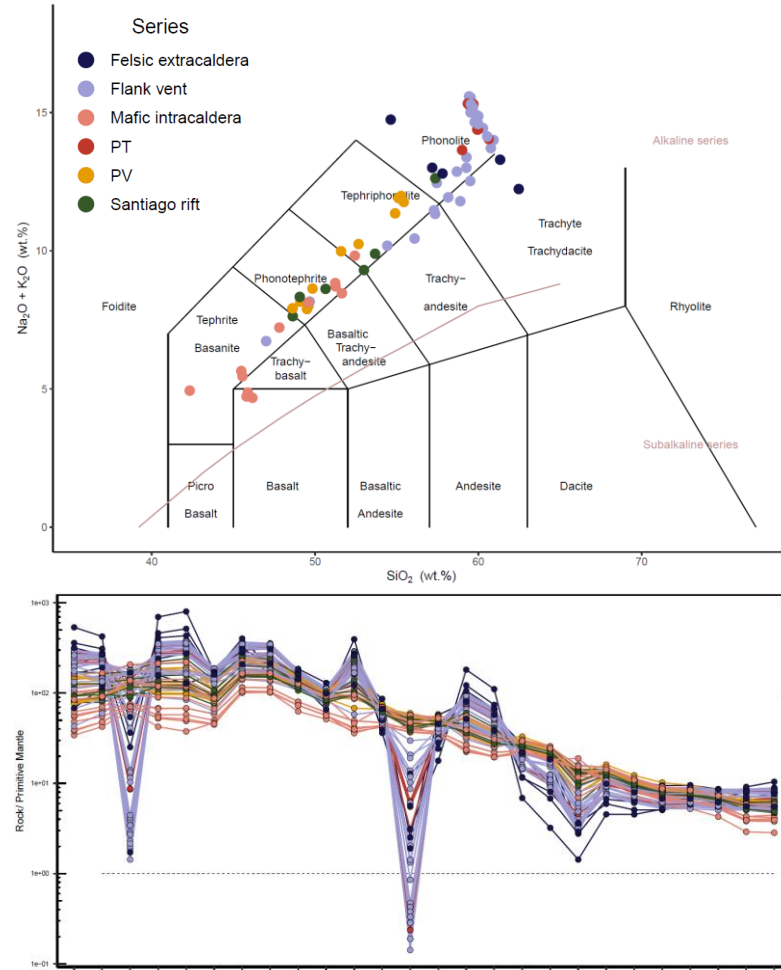
³INST. DE CIENCIAS DE LA TIERRA (JAUME ALMERA), CSIC, MARTI I FRANQUES S/N 08028 BARCELONA, SPAIN

Clinopyroxene/Melt Trace Element Partitioning in Sodic Alkaline Magmas

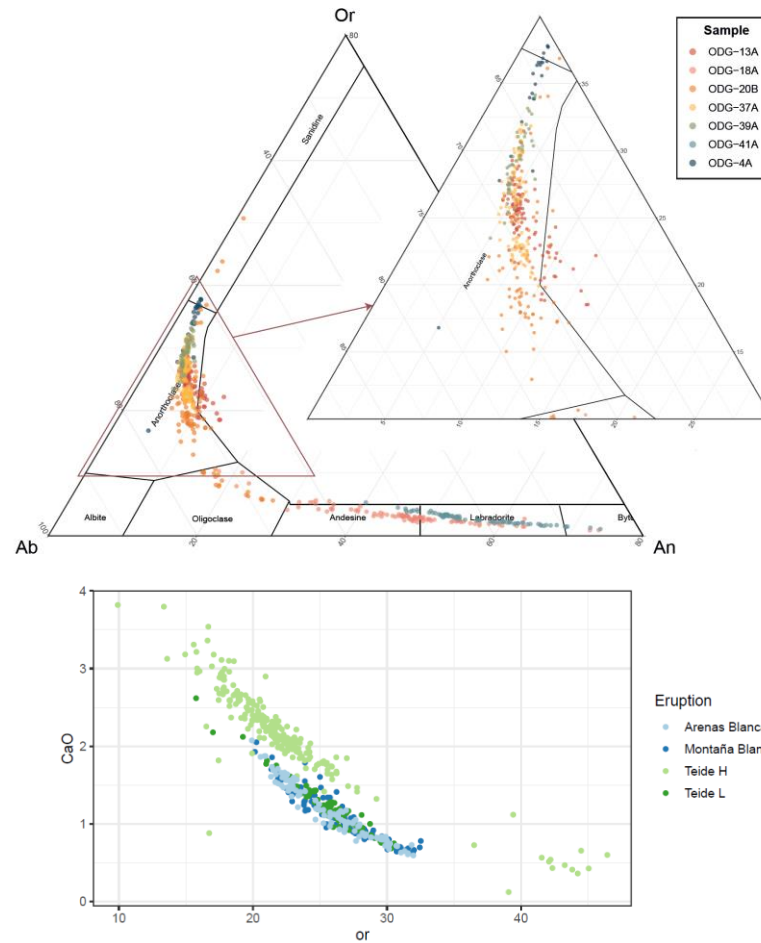
Charles D. Beard^{1,2*}, Vincent J. van Hinsberg², John Stix² and Max Wilke^{3,4}

New Data

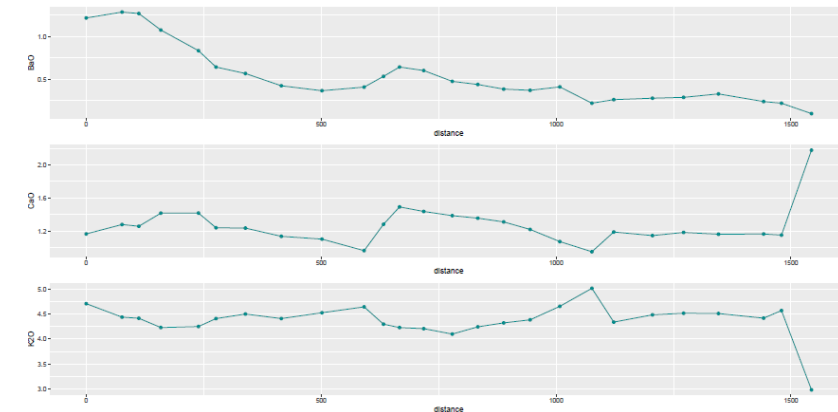
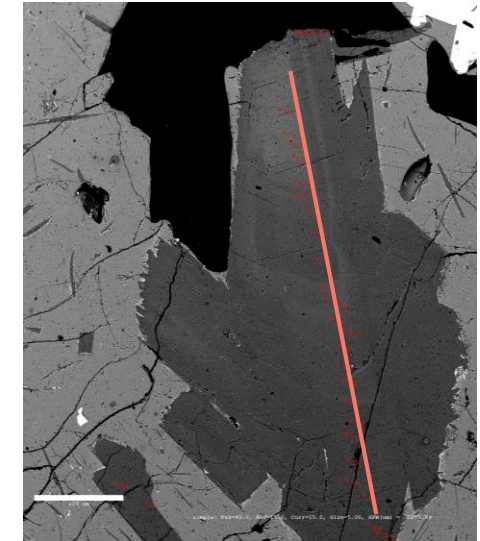
BULK ROCK MAJOR AND TRACE ELEMENTS ANALISES

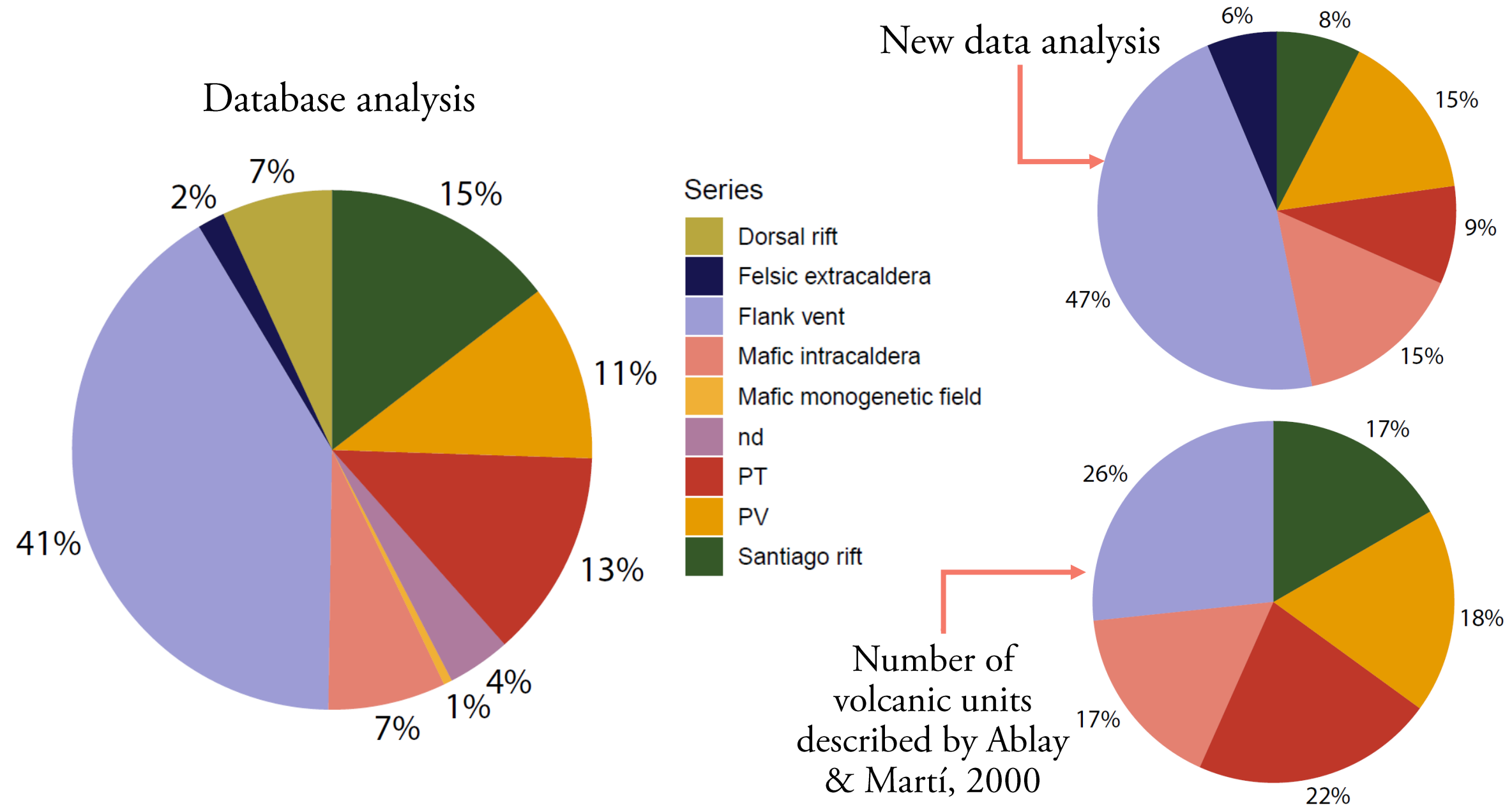


MINERAL CHEMISTRY

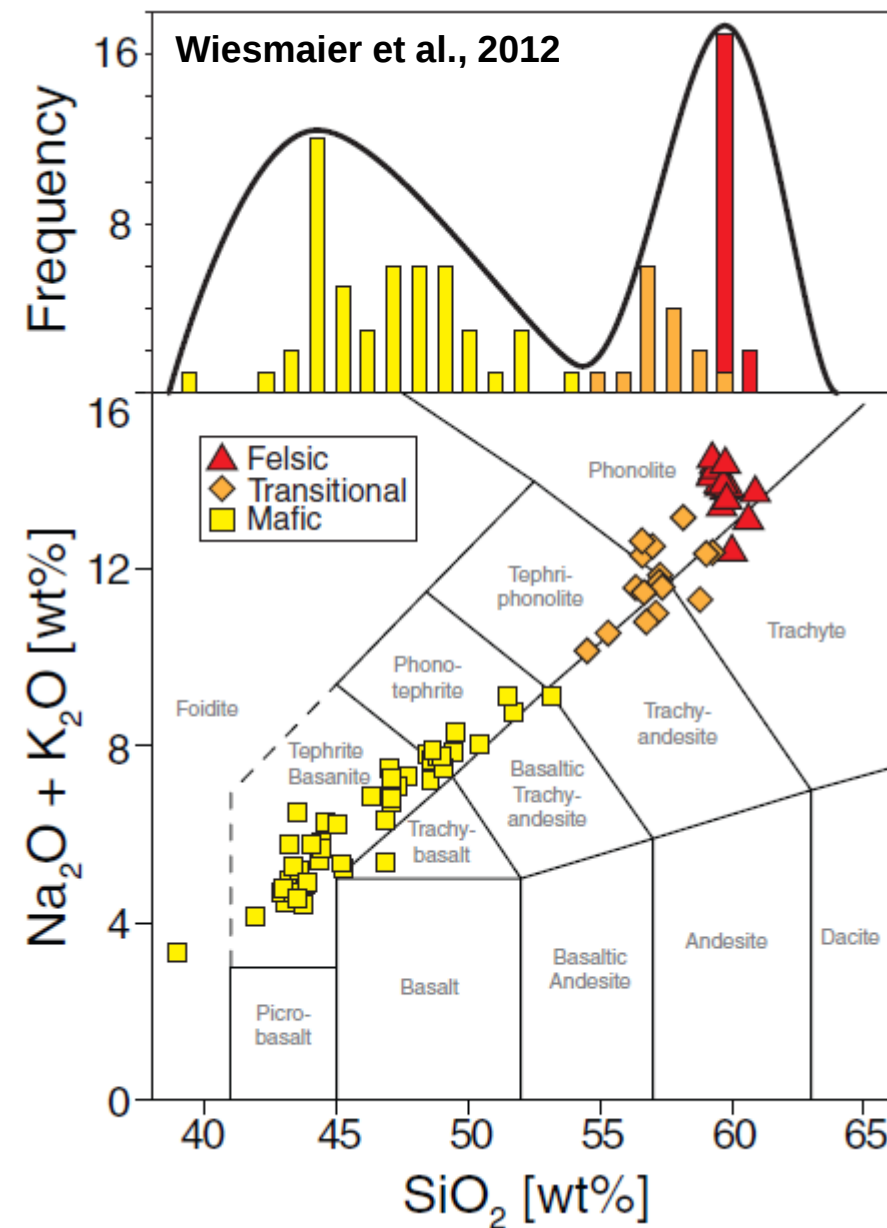
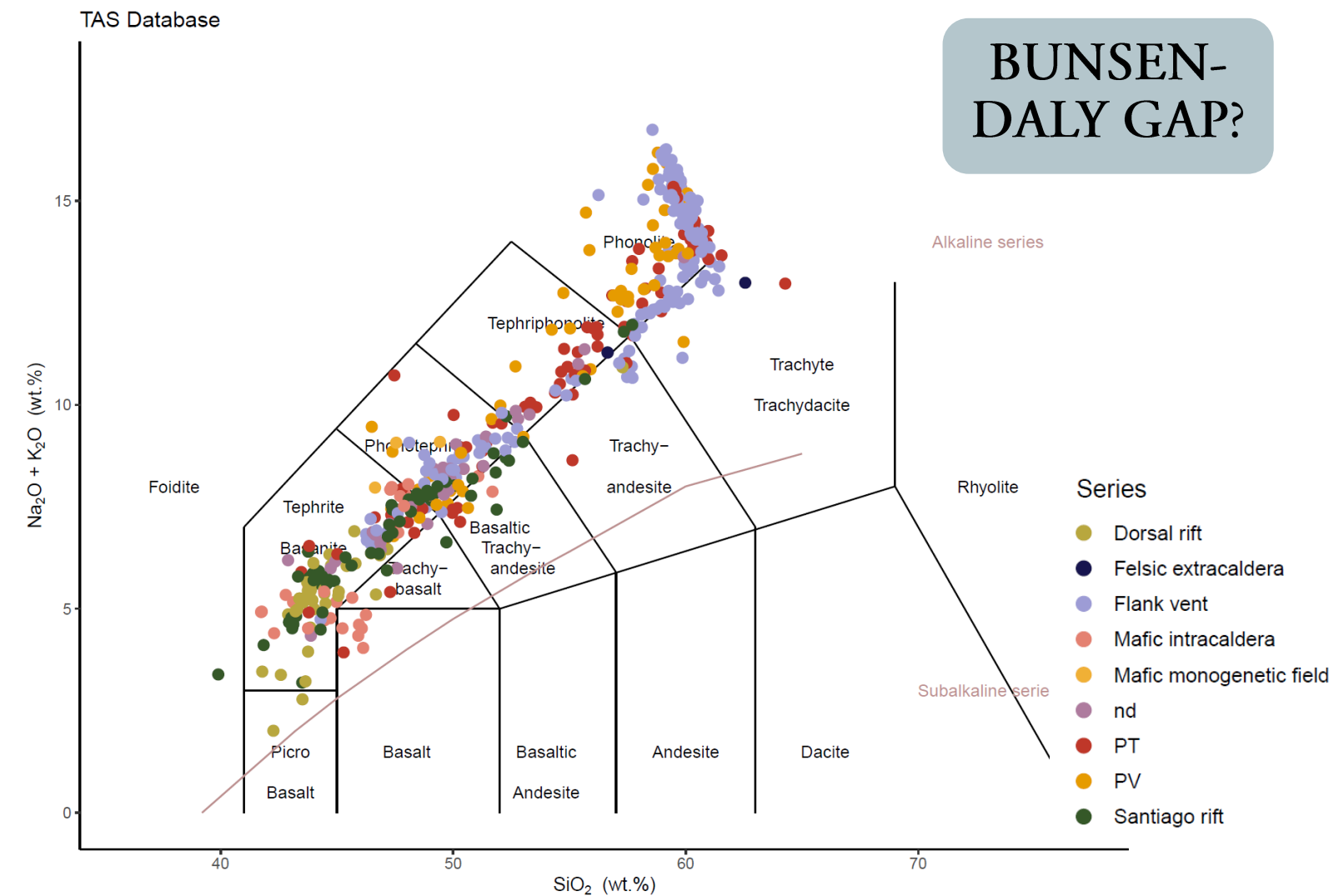


MINERAL ZONING





Comparison between database and new data



Importance of the database

Updated compilation of geochemical data of Tenerife recent volcanism accessible to **ALL (FAIR Data)**.

FAIR DATA PRINCIPLES

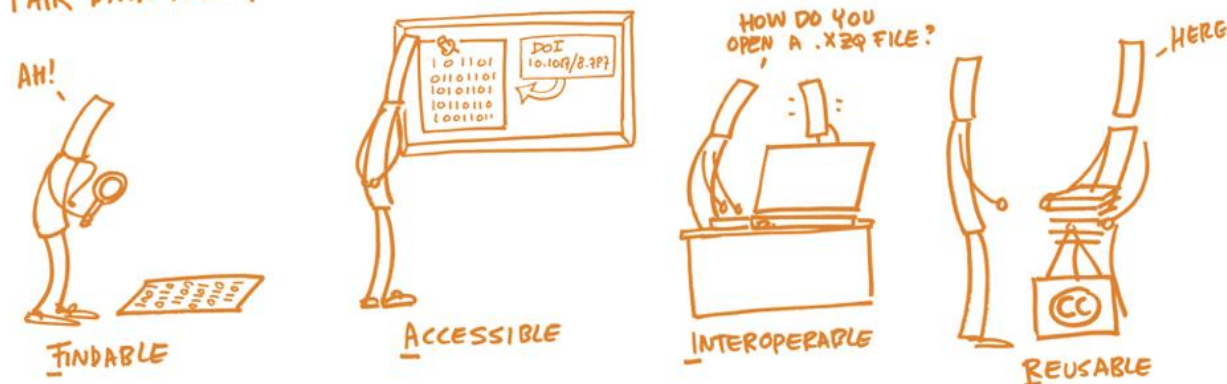


Image: <https://book.fosteropenscience.eu/>

Avoid repetition of analyses already performed by other groups: **save resources**.

What's next?

More analytical work on **mineral chemistry** (EMPA and LA-ICP-MS)

Correlate bibliography data with an **updated** volcanic stratigraphy.

Identify the principal **magmatic processes**. Shed light on the volcanic system in comparison with **geophysical data**.

Dating work (Ra/Th) and calculation of **timescales** of magmatic evolution

THANK YOU

An updated overview of the geochemistry of Teide-Pico Viejo volcanic complex (Tenerife island, Spain)

Olaya Dorado, Joan Martí, John Wolff and Adelina Geyer