**Description of the features included in the TephraDatabase**

**Tephra**: this particular feature is noy literally included, but belongs to the ontology of the database. A tephra is the sedimentary deposit that an explosive volcanic eruption leaves. A tephra includes for instance the ashes of the volcano that are transported by the wind and get deposited in vast areas. A tephra can also include ashes transported in other ways, for example when the volcanic plume collapses, “river” of ashes flow in the volcano edges: https://www.youtube.com/watch?v=Cvjwt9nnwXY.

Here there is a video of one of the eruptions of the data base, Vcha2008, it’s the eruption of Volcán Chaitén that happened in 2008, it is in spanish though: <https://www.youtube.com/watch?v=No7RnYitOTQ>

Here from the deposits of another one of the volcanoes, Volcán Llaime https://www.youtube.com/watch?v=RSQYUSDmVdM

\*I will be including more info and sharing things, though I must say that there is very little divulgation material regarding for example the chemistry of the eruption and what it means or even about the different manifestations of a volcanic eruption (for istance ashes or lava flows). In part that is why I’m doing the TephraDataBase and the associated visualization/explorer, so the barriers for interdisciplinary will be lower but also so people feel closer to this kind of knowledge. In particular, if you are a regular person maybe you won’t understand the different chemistry of the volcanoes but you can understand that they are continuously erupting, how many they are, where are they, etc. That is why I would also like to meet you in person before leaving! I have some more info that I think will be better communicated in person!

**Volcán**: Volcano which eruption produced the deposit from where the sample was obtained. It can also be the case, especially for the samples measured to obtain radiocarbon ages, that the sample was obtained below or over the eruption deposit. Not every identified eruption deposit

**Evento**: Name given to the specific eruption, of a specific volcano, that produced the deposit from where the sample was obtained.

**Referencia**: Publication from which the data was obtained

**Latitud**: Latitude where the sample was obtained

**Longitud**: Longitude where the sample was obtained

**Sección**: Sequence of vertically deposited sediments (unconsolidated matter, for example sand, mud) from which the samples are obtained. Sections can be of different nature, for example, lake sediment core, marine sediment core, a road cut. Some Sections are associated with one sample and other sections with many samples.

**SubSección**: The specific portion of the sequence from which the sample was obtained, it may be indicated with a different leter or number, for example Section1-1, Section1-2; it can also be indicated as distance from the top.

**SampleID**: The name assigned to the sample of the subsection that has been measured. In a same subsection two different samples can be obtained and named differently if, for instance, two different kind of materials are measured. For example in a deposit from a specific eruption, we can measure the geochemistry of the ashes to identify the volcano that produced it; at the same time we can measure a piece of charcoal found in the ashes and assign a different SampleID. In this case, the charcoal is not produced by the volcano but that is useful for obtaining an age for the eruption.

**SamplePoint**: In some cases, for instance in a sample of ash, specific measurements can be made in individual ashes, all this ashes are microscopic but can be “picked” by hand looking through a microscope, then the chemistry is measured in each individual ash and a set of 20-30 measurements of each elements are obtained in the same sample.

**MeasurementRun**: A name for a group of measurements that were perfomerd at the same time. For example all the measurements that a machine did during one day under the same conditions correspond to the same MeasurementRun.

**Edad**: Age estimate of the sample. Most of this are radiocarbon ages, which is a measure of the radiocarbon content of an organic (made of carbon) sample, this age must be then calibrated to obtain calendar ages. Other type of age corresponds to "Historic", in this case, no sample was measured to obtain an age for the eruption, but rather the age has been reported in historic records. For example “Historic, 2015” is an eruption that happened 2015 and when geologit go to the field to pick up the samples, people from the surroundings tell them “this is the ash from the eruption of 2015”.

**ErrorEdad**: Uncertainty of the age associated to the measuring technique.

**SiO2, TiO2, Al2O3, FeO, MnO, MgO, CaO, Na2O, K2O, P2O5**: Major elements, this are the oxides of the most abundant chemical elements that build rocks, they are ~99% of the rock. SiO2 is the most abundant and in its pure form it forms quarts and opal, among others. This different elements form different mineral which form the rocks, different minerals use different amount of each of this elements and are stable at different temperature and pressure conditions. In general, the less amount of SiO2 of a rock, it comes from a deeper source (the mantle).>

**LOI**: Loss on Ignition. It indicates the amount of volatile gases of the sample. When the sample is heated during the laboratory procedures to measure its chemistry, this volatiles escape. In these kind of rock this volatiles are usually H2O, CO2, S.

**Total**: It is the sum of the measurement of the values from SiO2 to LOI. It gives an idea of the quality of the measurements. It gives an idea of the quality of the measures, if the total is lower than 96% is considered low quality data.

**Rb-U**: Trace

**Rb-U**: Trace elements, this are elements that are found in very little abundance in rocks but that give a lot of information regarding its history, from the relative amount of this elements we can interpret the evolution of the volcano and why it exists, why the eruptions occur.

**87Sr/86Sr, 2se**: Ignore, not yet included

**TécnicaDeMedición**: Laboratory technique employed to estimate the concentration of a determined element in a rock or its radiocarbon age.

**MaterialMedido**: Material in which was measured age, mayor elements or trace elements.

**Magnitud**: Size of the volcanic eruption. It is calculated from the estimated volume of material erupted from the volcano in a particular eruption. It goes from 0 tu ~7-8. It is very important because the bigger the eruption, the more likely is to find their ashes far from the volcano.

**TipoDeSección**: Type of Section, can be Marine core, Lacustrine core, Terrestrial (this is the case of the example)

**CódigoLaboratorioRadiocarbono**: Especific code assigned by each radiocarbon laboratory to each sample.

**Comentarios**: Coments

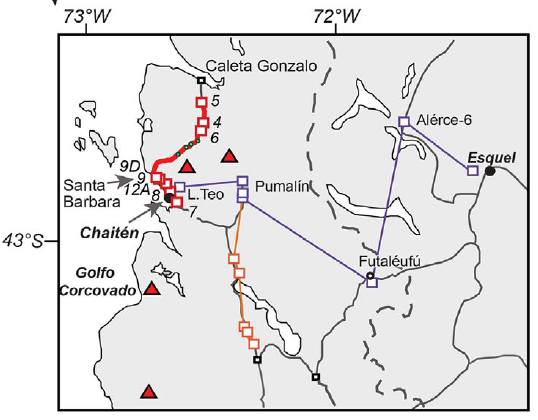
**Mapa?**: If the publication where the data were published includes a geological map

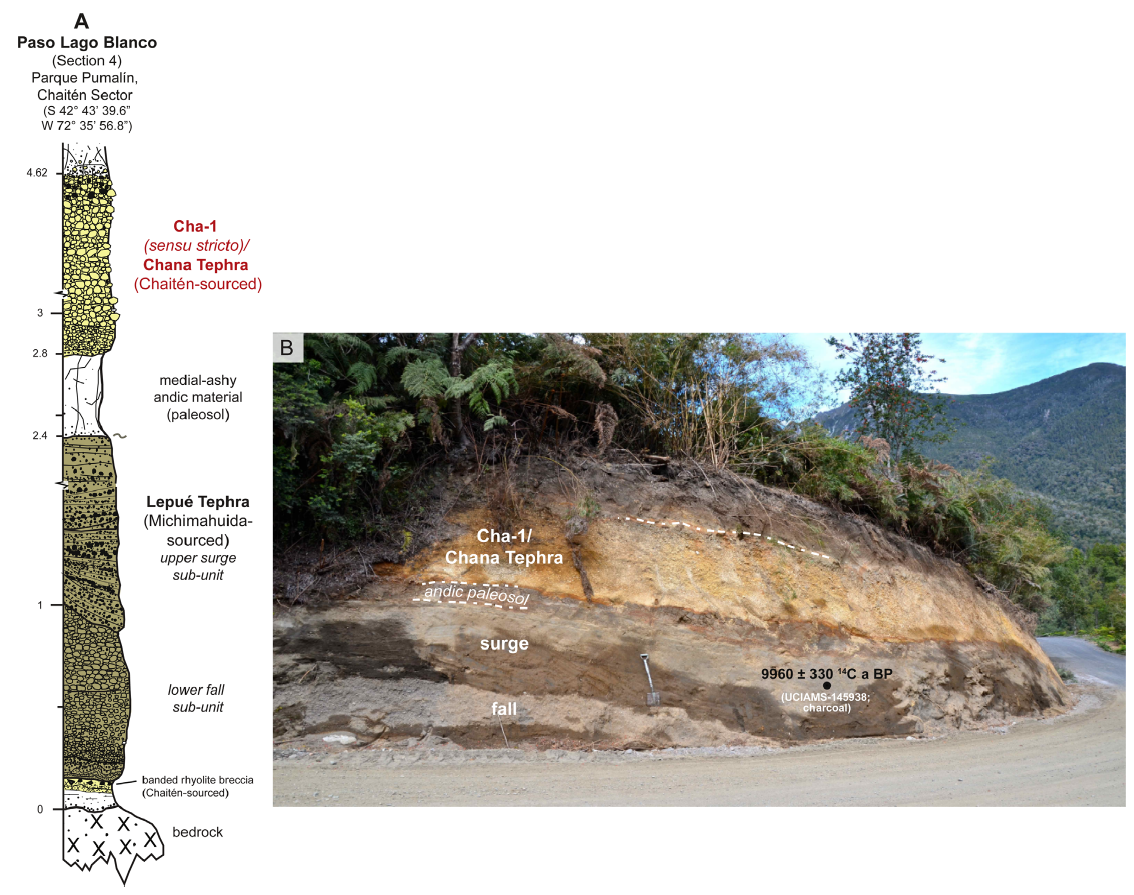
**Flag**: Flag for data that might have some problem

* Flag = 1:
  + “The sample position could not be obtained even when contactic the co authors. Thus a position equal to the volcano has been assigned.”
  + “The measurement of microlitic glass lowers the accuracy of the measurements, see Alloway et al., 2017b.”
* Flag = 2: “Esta información fue compartida privadamente por alloway, quien explicitó no querer comaprtirla.”

**DescripciónFlag**: Description of why the data is flagged

EXAMPLE



This map indicates the position (**Latitud, Longitud**) of different **Section** studied, each section is represented by a squares. At each section at least one tephra (eruption) is identified. 

In the above picture, section 4 is photographed, there we can see two eruptions, Cha-1 above and Lepué above, each of this are **Subsections** of section 4. In the left there is a schematic representation of the section. Each subsection is sampled at least to measure the chemical elements. In some cases, if any organic matter is observed, additional samples are obtained, each sample is identified by a **SampleID**. In this case “charcoal” is indicated with a black dot that indicates the specific place where a charcoal piece was extracted from the deposit. Afterwards the amount of radiocarbon of the charcoal was measured in a laboratory and with that information we can estimate the calendar age of the deposit.

The obtained sample of sediment (for measuring chemical composition) is observed in the microscope:

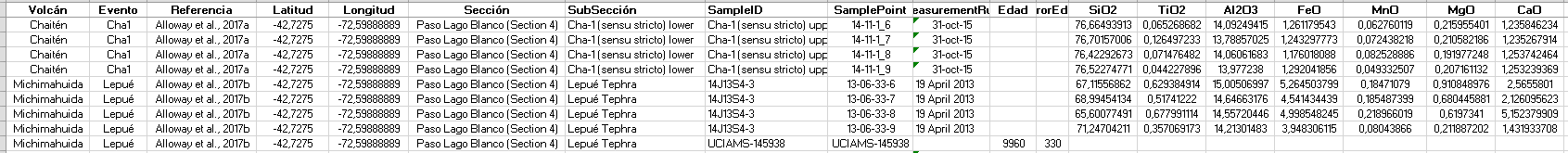




Ash is actually volcanic glass and it looks like this:

In each sample we can “pick” different volcanic glass shards and measure the geochemistry of each shard, so at the end at each sample we can measure between 1 and ~30 different glassshards, in the database each one of this measurement is identified as **SamplePoint**

With the information of the chemistry of the glass shards but also from the physical characteristicsc, color, grain size, etc., the deposit is identified as coming from a specific **Volcano** and **Eruption**, in this case the Cha-1 subsection coms from Volcán Chaitén and that specific eruptions is calles Cha-1

In the data base this specific example looks like this: