Can you think of reasons why we would want to date volcanic eruptions?

Wide spread ash/tephra layers are among the best relative age indicators for other geologic, archeological events. When we take sediment samples, volcanic eruptions can act as a benchmark that pinpoints an exact time in history. If you know there was a massive volcanic eruption 500 years ago and you take a sediment core from 30km away, you'll see a thin layer of ash and will know that point in the core is 500 years old, allowing you to create a more accurate timeline of deposition above and below the ash.

Furthermore, by dating volcanoes we can study magnetic field reversals (change in a planet's magnetic field). When lava cools down it becomes a permanent magnet, so the magnetic fields of the layers of basalt together with a dating method tell you something about the history of the magnetic field.

Emissions from volcanic activity can have significant impacts on climate. So dating eruptions compared to paleoclimate records is important for understanding forcings and uncertainty in climate models.

Dating volcanoes allows us to determine the frequency to help make potential predictions. In some cases, dating an eruption may allow for a connection to be made to another event. For example, increased eruption frequency to a known increase in the rate of subduction in that area. We can also use them to determine plate motion, e.g. a chain of hotspot volcanoes forms over a stationary hotspot, so by dating the individual volcanoes we can tell the direction and speed at which the plate(s) on which the volcanoes form on are moving. This knowledge, in turn, can help paint a picture of what the continents will look like in the future. East Africa is currently rifting, and one of the ways we can tell this is by analyzing and dating volcanic eruptions.

Can you think of some things that tephrochronology can help us with?

Threphorchornology can help us for anthropological reasons. Suppose you found a human skeleton, holding some type of primitive weapon, covered in volcanic ash. The volcano only erupted in 3400 B.C. Now we have an accurate time frame of when this person died and when this tool was used. Furthermore, dating a volcanic rock and then finding the same age in a nearby sediment tells you how and where the sediment formed. Dating a volcanic rock overlaying, or cross-cutting sedimentary units can constrain the age of those sediments. Being able to find the appropriate date for the Mount Mazama (Crater Lake, Oregon) eruption at about 7,700 years ago has made it easy to determine if archeological objects within the ashfall area are older or younger than that age.

Overall, dating volcanoes and tephrochronology can help us lean the age and relationship to surrounding features which can lead to many interesting conclusions.