

originated with the Variscan and Alpine *orogenies* (mountain-building events). The Variscan orogeny (the unifying geological event that connected all the continents to form Pangaea; see our brief essay on Pangaea [here](#)) took place between 370-290 million years ago and its remnants make up the setting for many of today's wine regions located on the Iberian Massif in western Spain and most of mainland Portugal; France's Armorican Massif, Massif Central and most of Corsica; Italy's Sardinia and parts of Calabria; Central Europe's Bohemian Massif (think Riesling and Grüner Veltliner countries), and others. Nearly all of what is left of the Variscan Mountains is rooted in igneous rocks like granites or volcanic, and metamorphic formations such as slate, schist and gneiss.

After the Variscan orogeny (also known as the Hercynian), Pangaea started to break up, separating land masses and creating new continents, eventually leading to our current global environment. The once gigantic Variscan range may have stood as high as today's Himalayas but lost thousands of feet to erosion over a two-hundred-million-year period. During that time, the Iberian Peninsula had two major elevated reliefs left from the Variscan range: the Iberian Massif, which covers the western side of Spain and almost all of mainland Portugal, and to the east the Ebro Massif, sandwiched between Catalonia and southernmost areas of France. The latter shares its name with the long, cone-shaped Ebro Basin opening toward the southeast, with its famous river, the 930km long *Río Ebro* that starts in Cantabrian mountains and flows southeast through Rioja and Navarra, eventually spilling into the Mediterranean just south of the Priorat and Montsant wine regions. Most remnants of the Ebro Massif are now covered by younger sediments down in the Ebro Basin, but in the Pyrenees, they are steep, rocky mountains referred to as the *Axial Zone*. These remnants are also present in Catalonian wine regions and France's Roussillon (Banyuls and Collioure, among others).

The Alpine Orogeny and the formation of the Pyrenees and the Ebro Basin

The next stage of development of this landscape is due to the Alpine orogeny, which is still active today. The African and Indian tectonic plates continue their mashup as they head north, pressing against the Eurasian plate (today's Europe and Asia), causing the formation of most of the higher peaks that can be found in Europe, North Africa, and Asia. These tectonic movements coupled with the formation of the Atlantic Ocean led to the opening of the Bay of Biscay, the large Atlantic section between Northern Spain and Western France. The underwater part of Northwest Spain (Galicia and Asturias) and Western France (Brittany and the western end of the Loire Valley) that were a single landmass during the Variscan Orogeny began to separate. Through this millions-of-years process, the Iberian Peninsula pivoted about thirty-five degrees in a counterclockwise direction. This produced convergence forces between the Iberian plate and the southwesternmost part of the Eurasian plate, and uplifted today's Pyrenees. In France, this pivot set the stage for the development of France's Aquitaine Basin, home to Bordeaux and many other wine regions, to cite one of many examples of its far-reaching influence on Western European wine regions.

The Alpine Orogeny is much more recent, and is related with the formation of the Alps and too many other mountain ranges to mention from Western Europe (only as far as Spain), Morocco, and through the Middle East to Asia, and even into Indonesia. Its name is not to imply that they are all considered part of the Alps mountain range, it's that the Alpine Orogeny is the established geological time frame that includes all mountains on Earth that developed during this specific period.

After this second tectonic cycle there was a more relaxed period with few volcanic eruptions and earthquakes caused by tectonic movements. During these tens of millions of years, the higher parts