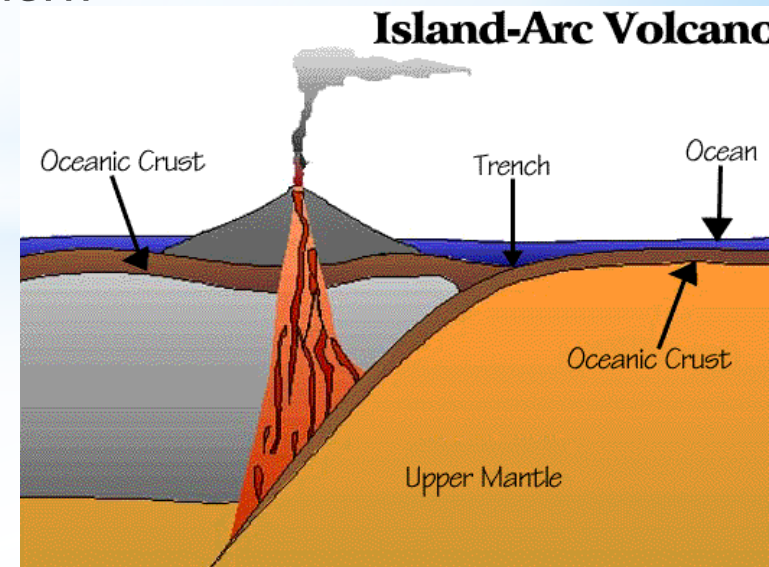


ISLAND ARC

2nd General Lyceum of Oraiokastros
ERASMUS+ TEAM

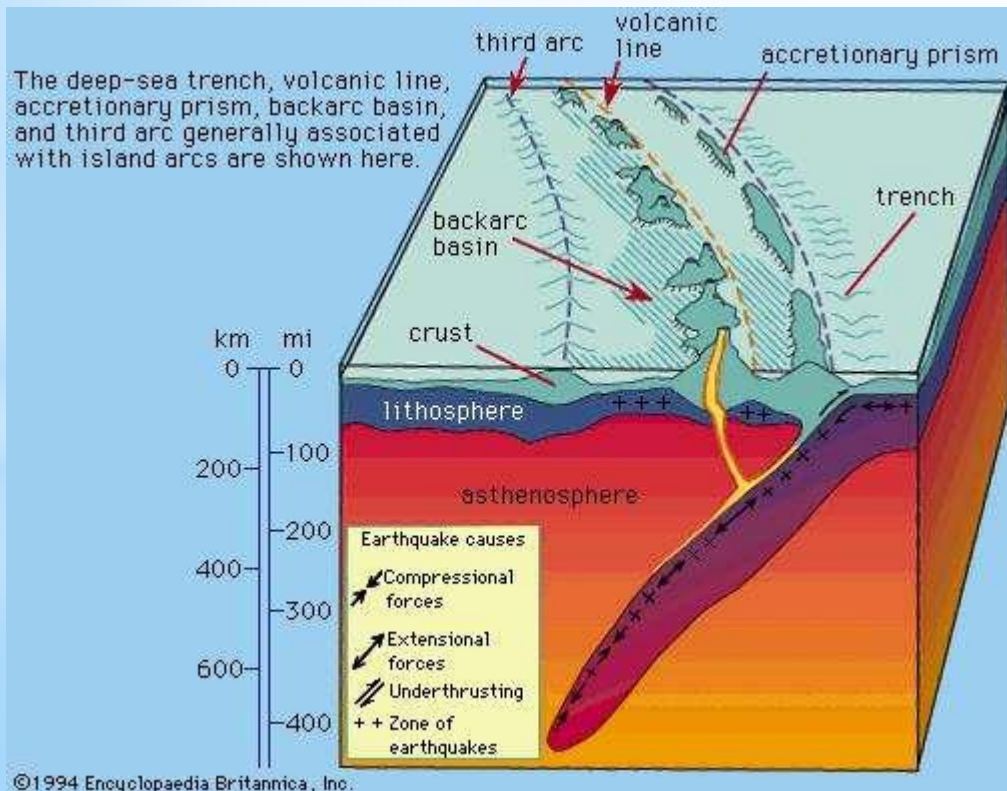
A FEW WORDS

An island arc is a type of archipelago, often composed of a chain of volcanoes, with arc-shaped alignment, situated parallel and close to a boundary between two converging tectonic plates. Most of these island arcs are formed as one oceanic tectonic plate subducts another one and, in most cases, produces magma at depths below the over-riding plate. It is a common phenomenon in several parts of the world, while it can also be found in southern Greece (Crete, Dodecanese and southern Peloponnese) .



HOW A ISLAND ARC IS FORMED

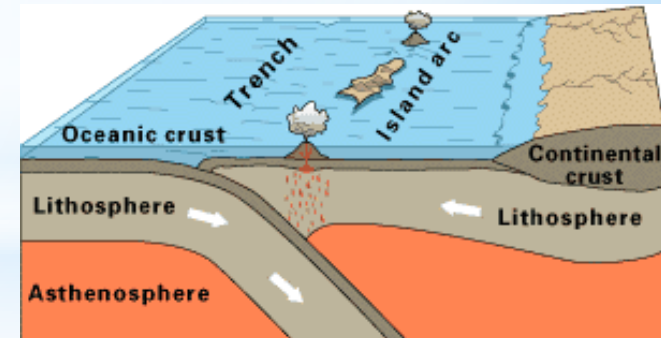
The island arc appears at the point of convergence of two tectonic plates, usually a continental with a ocean, without excluding its appearance at the point of convergence of two oceanic plaques. When converged, the heavier ocean plate begins to sink beneath the lightest continental, entering the mantle to a depth of up to 600-700 km. The sinking plate begins to melt, and because its material is lighter than that of the mantle it rises, liquefied to magma, due to the buoyancy, resulting in volcanoes emerging behind the convergence region.



MAIN SECONDARY OF THE ISLAND ARC

The secondary features of an island arc are:

- * **In the subduction zone**, the addition of volatiles such as water induces partial melting of the oceanic crust because the volatiles (such as water) boil faster than the surrounding rock, forcing the rock apart. This process, called flux melting, generates low-density calc-alkaline magma that buoyantly rises to intrude and be extruded through the lithosphere of the overriding plate. The resulting volcano chain has the shape of an arc parallel to the convergent plate boundary and convex toward the subducting plate. One of the theories to explain the arc shape views this as a consequence of the geometry of the spherical plate crumpling along a line on a spherical surface, but only the more broadly shaped arcs can be explained in this way.
- * On the subducting side of the island arc is a deep and narrow **oceanic trench**, which is the trace at the Earth's surface of the boundary between the downgoing and overriding plates. This trench is created by the gravitational pull of the relatively dense subducting plate pulling the leading edge of the plate downward. Multiple earthquakes occur along this subduction boundary with the seismic hypocenters located at increasing depth under the island arc: these quakes define the Wadati-Benioff zones.
- * **Ocean basins** that are being reduced by subduction are called '**remnant oceans**' as they will slowly be shrunk out of existence and crushed in the subsequent orogenic collision. This process has happened repeatedly in the geological history of the Earth

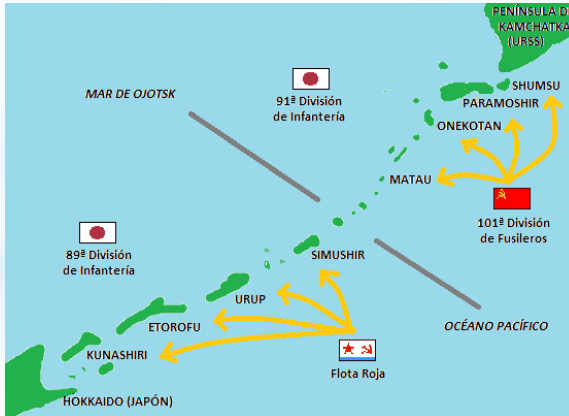


ISLAND ARCS ALL OVER THE WORLD

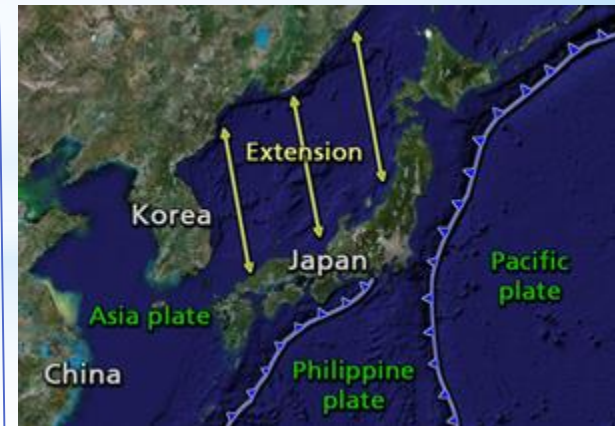
Aleutian Islands



Kuriles Islands

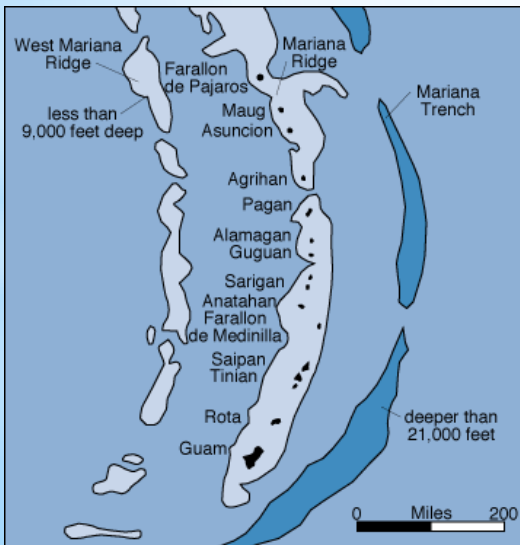


Japan

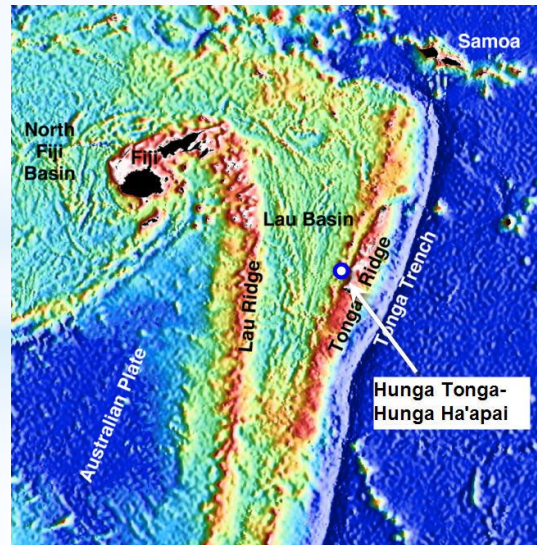


ISLAND ARCS ALL OVER THE WORLD

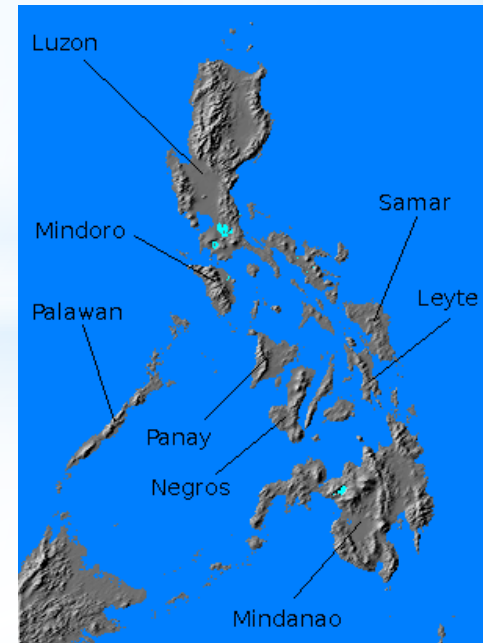
Mariana Islands



Tonga

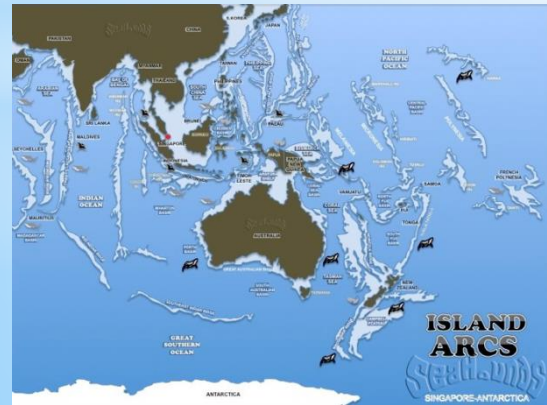


Philippines



ISLAND ARCS ALL OVER THE WORLD

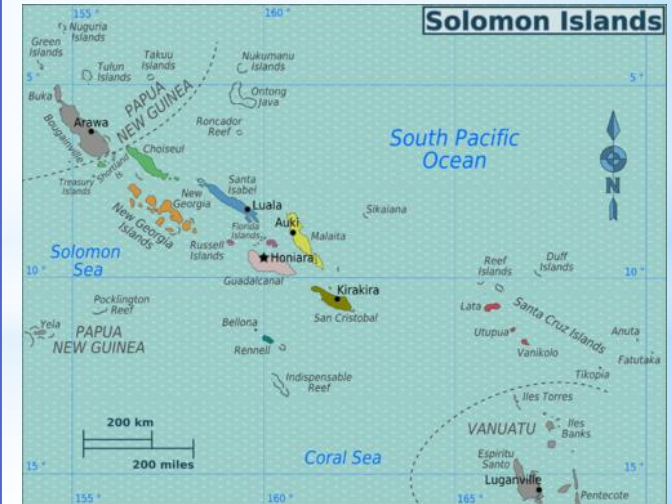
New Zealand



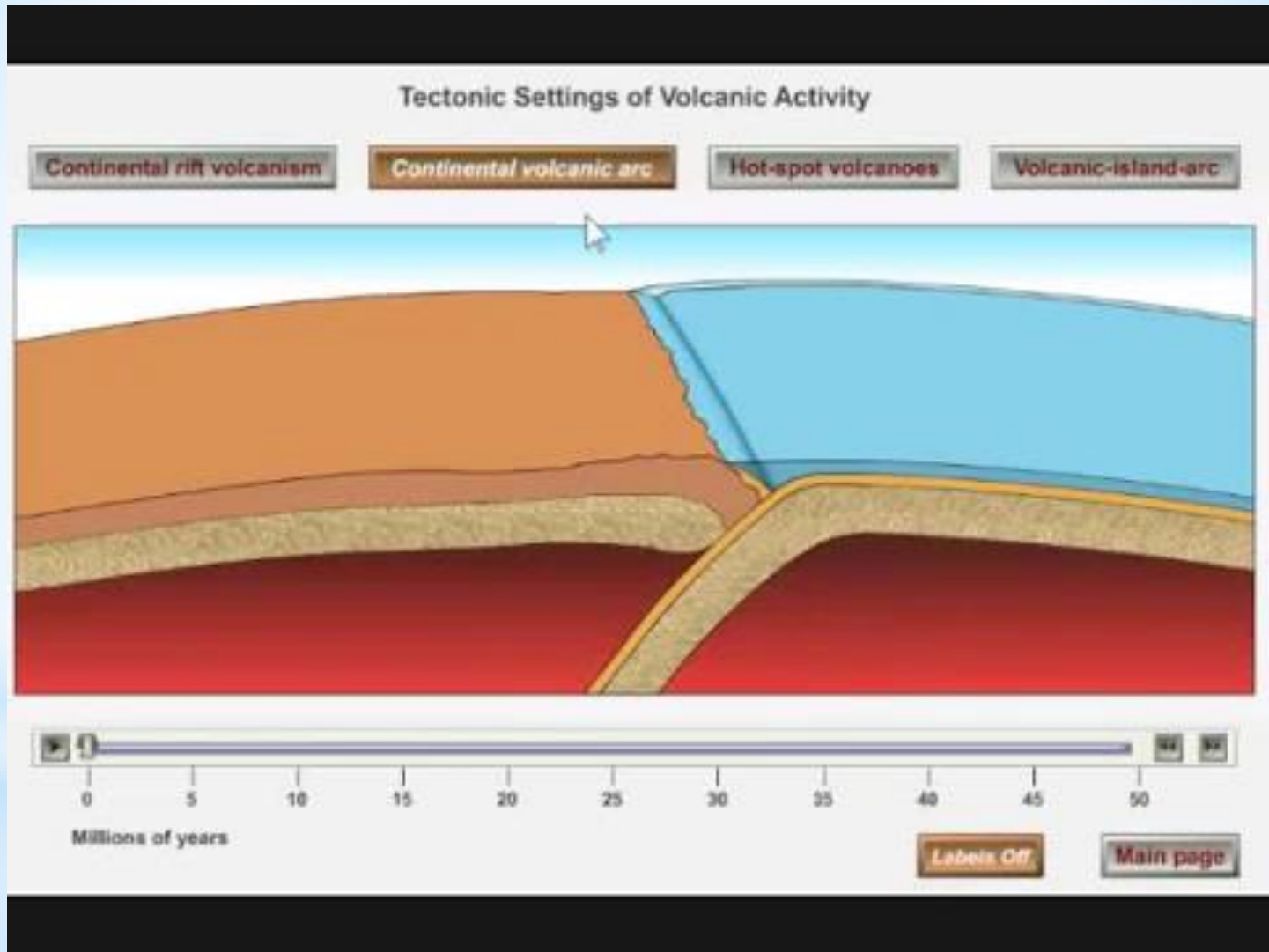
Ogasawara Islands



Solomon Islands



A SHORT VIDEO ABOUT ISLAND ARCS



HELLENIC ISLAND ARC

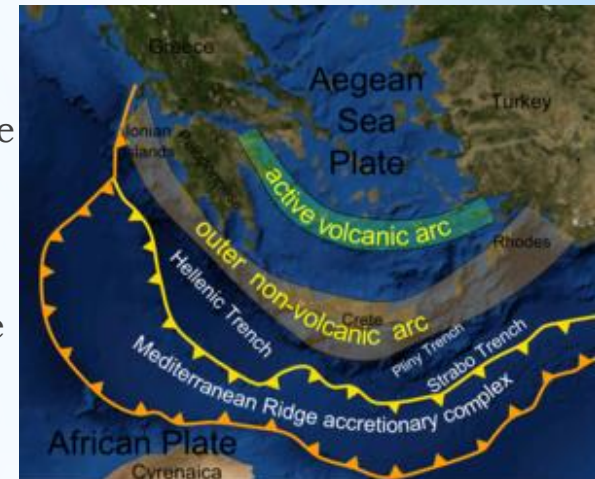
The island arc of Greece (sometimes referred to as the "Arc of the Aegean") is a characteristic example of an island arc. It is created due to the convergence of the African tectonic plate with the Eurasian (about 2.5 cm / year) in the area south of the Peloponnese and has all the features described above.

The precursor extends from Rhodes, passes south of Crete, SW of the Peloponnese and reaches up to the Ionian islands. Its depth is quite large, and includes the deepest point of the Mediterranean (open to Mani, 5200 meters deep).

The island arc includes the southern Dodecanese, Crete, parts of the South and West Peloponnese and the southern Ionian Islands (Zakynthos, Kefallonia, Lefkada).

North of Crete is a shallow sea, the Cretan and Carpathian seas.

Finally, the image is complemented by the existence of the volcanic arc of the southern Aegean, which includes the islands of Nisyros, Santorini, Milos, Kimolos, Kos, Methana and Sousaki Korinthia, where volcanic and / or geothermal activity is observed. There is also a gravitometric and geomagnetic disorder in the area.



Volcanoes of the Hellenic arc. Arrows show direction of plate movement. Modified from Nichols (1971).

**THANK YOU
FOR YOUR
ATTENTION!**

