

COMPARING THE HAWAII AND PITCAIRN HOT SPOTS

How are hot spots formed and how do they work? What is intraplate volcanism? Why is the “Ring of Fire” the location for so many volcanoes? Which are the more explosive eruptions?

Most active volcanoes are formed near (1) convergent plate boundaries where an oceanic plate (Pacific Plate boundary = Ring of Fire) is subducted or goes under a continental plate. The partial melting of continental rock is a major source of explosive eruptions. (2) Divergent boundaries or rift zones (where the plates are spreading apart) are another location. Here the more fluid basaltic magma results in more lava flows with less explosive eruptions.

Only 5% of the world’s active volcanoes are located within plates (intraplate). Hot Spots may be the result of a plume of magma originating at the core-mantle boundary (3000km deep). The plumes are presumably generated by slow convection currents. A hot spot stays in the same location for millions of years. As the Pacific Plate moves over these hot spots, volcanic ridges are formed with islands surfacing then wearing away. (The Suiko seamount is 65 million yrs old, Midway is 27.7 and Hawaii less than 1 million yrs old.) Pitcairn Island, like Hawaii, is over a hot spot. It rises 335m above sea level while most of the older islands are less than a meter or two above the ocean’s surface.

