WINTER DAYS ON THE VOLCANIC ISLAND OF TENERIFE

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Introductory Note

I am poorly qualified to write a technical paper about Tenerife. I hope that anyone reading this article, who has an in-depth knowledge of the Geology/Tectonics of the Canary Islands archipelago, will be able to chuckle good humouredly at my naïveté. For those who know little about the location, I do hope that some of my enthusiasm will rub off on them, and that they will themselves be tempted to seek winter sunshine on the volcanic island of Tenerife. I trust that nobody will take too seriously my inferences to impending volcanic activity, and view it all in a Geological time frame. However, we shall ourselves be arranging our next visit before 2007!

We had purchased a late Internet deal for one week in Tenerife, just before Christmas in 2004. It was a place which we had always wanted to visit, but we had done little homework in advance of the trip. We arrived at our hotel in Los Gigantes at sunset, with the high cliffs appearing to be on fire in the lingering sunlight, and felt that we had fallen on our feet.

The next day was hot and cloudless. It was a case of 'on with the shorts and sandals', and 'off to the Car Hire office'. "Where to now?", "To the big volcano of course", but neither of us was clear as to what that might involve.

The road wound steadily upwards, leaving behind the relatively dry coast line and entering into pine woods. We got glimpses through the trees of a large grey mountain, shimmering in the bright sunshine, which we reckoned was the volcanic cone of El Teide. However, we only got a proper view of it as we crossed over the ridge surrounding the Caldera and dropped into the bowl of the huge volcanic desert. It was indeed a very different world.

We could see what looked like a cable car travelling up the steep slope of the cone itself, something we had not reckoned on. We headed to the base of the slope and joined the line of parked cars. We had a shock on getting out of the car, to find the temperature to be quite sharp, in fact hardly surprising for an altitude of over 2000m! The 'shorts' no longer seemed a good idea. "We will have to stay under cover" we mused. However, on reaching the front of the queue for the cable car, we learnt that it would stop some distance below the summit, and that it would be necessary to walk the remaining section over loose volcanic scree; not something we fancied doing in 'sandals'. "Never mind", we said, "it will have to be tomorrow".

But we awoke the next day to the sound of heavy rain, which continued on and off until dusk. The following day was bright, and dressed in all the clothing we had brought with us, we again set off up the mountain road. This time the view of El Teide was rather different, appearing very sharply defined and close, with snow covering much of the upper part of the cone (*illustration 1*).

Illustration 1: El Teide Volcanic Cone from within the caldera

The relatively young lava flows were very apparent on the flanks. There was no line of cars at the approach to the cable car station, and the Park Warden, whom we eventually located, explained that the depth of snow at the summit meant that the cable car was unlikely to be operating for at least a week. So we never saw the inside of El Teide's cone, nor did we experience the reportedly breath taking view from over 3700m.

However, we found that there was plenty to do for a week, on this hugely varied island, with its tropical north and arid south. The only real commonality is that it is composed entirely of volcanic materials, all be it in many different forms. The so-called Daisy Stone (*illustration* 2) was a splendid example of a fractured basalt boulder.

Illustration 2: Daisy Stone, fractured basalt boulder

The area around Los Gigantes is transitional between north and south. The gardens were a blaze of colour, apparently flourishing on the black volcanic rubble, with a great range of bougainvilleas draping over the surrounding walls (*illustration 3*).

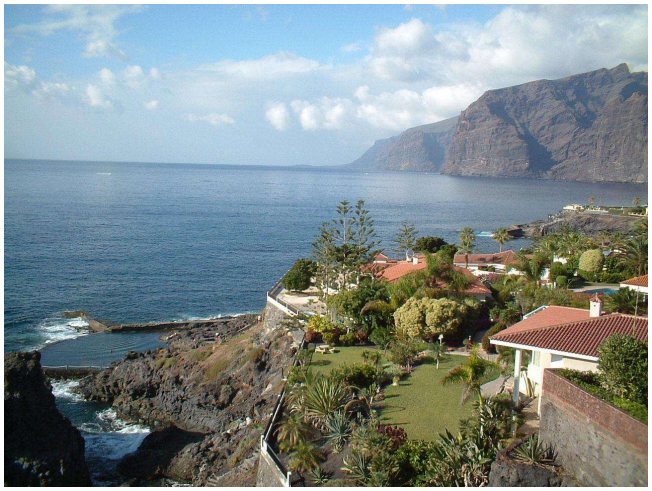


Illustration 3: View across the Bay at Los Gigantes

We had been warned about there being no traditional sand on the Tenerife beaches, but were agreeably surprised to find the black volcanic sand in the small rocky bays to be quite soft and inviting *(illustration 4*).

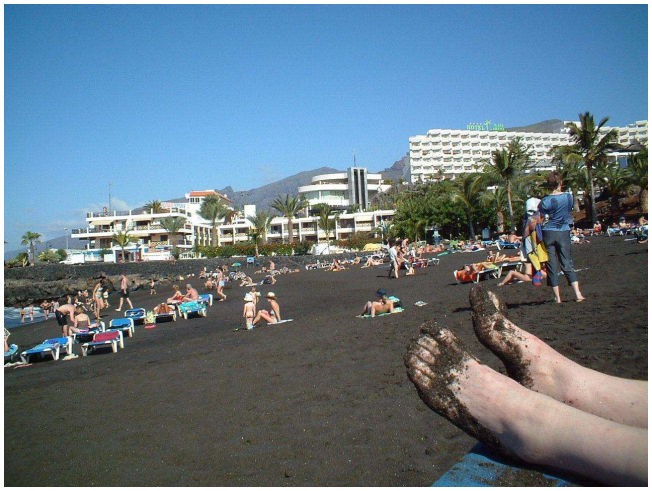


Illustration 4: Volcanic Sand
Playa de la Arena near Puerto de Santiago

There were many bill boards around the village proclaiming the attractions of 'dolphin spotting' in the bay. We joined one of the expeditions and were taken by boat along the shoreline of the massive cliffs, to the locality of the fish cages where the dolphins were expected to be congregating in readiness for the next feeding time. A bottle of Champagne (Spanish!) was on offer for the first person to spot a dolphin, but I found my eyes were on the cliffs towering some 600m above us. The Teno Massif comes in the Old Basaltic series. The very pronounced horizontal layering means that it can be mistaken for sedimentary rocks, but is indicative of the massive nature of the lava flows. From a distance, the pronounced grey streaks down the cliff faces appeared as a major feature. On closer inspection, I thought they must be Dyke Intrusions. However, despite their scale, I later judged them to be Mineral Veins.

This was the week before the Indian Ocean disaster; which occurred on Boxing day 2004; otherwise our thoughts at the time might have been centred on 'tsunamis'. JC Carracedo (1994) has proposed that there are three major rift zones, emanating from the caldera area (*illustration 5*) and the Los Gigantes cliffs are related to the Western branch. He has stated that "the Islands reveal scars of some of the largest landslides ever to have occurred on Earth".

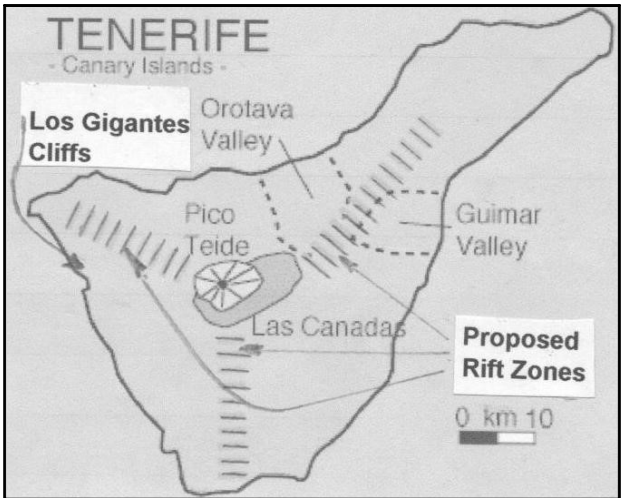
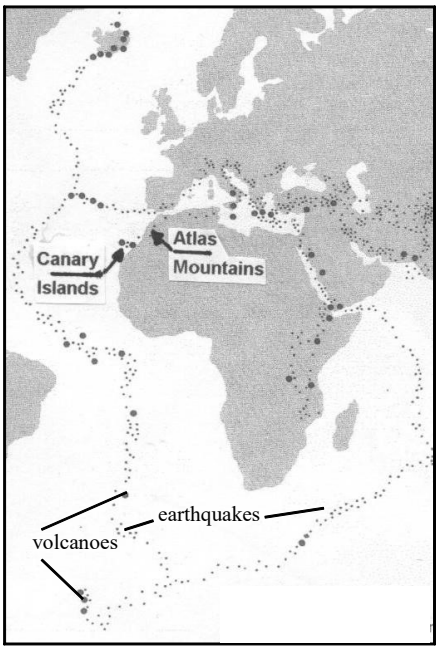


Illustration 5: General Layout of Tenerife Island
Rift Zones proposed by Carredo (1994)

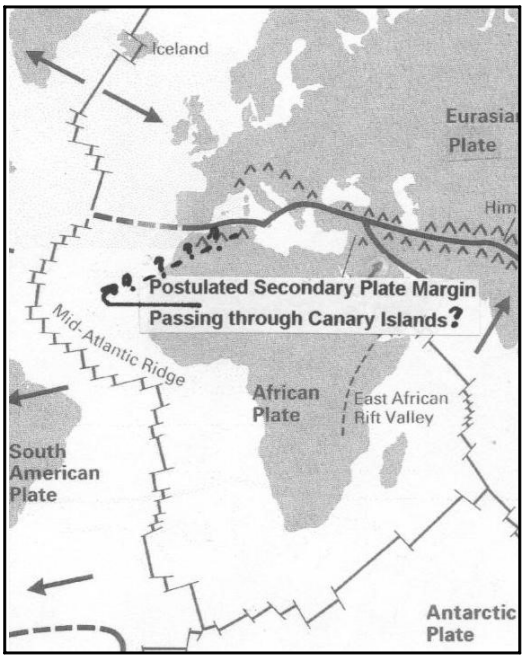
In the following months, I puzzled about the Geological origins of the Canary Islands. They are situated quite some distance from the identified location for the Margin between the African and the Eurasian Plates and even further from the Mid Atlantic Ridge. Some sources of Geological comment appeared to suggest links to the Atlas Mountains, for which the second phase of major activity, responsible for massive uplift and inversions, has been dated at 20-30 Ma. This may be a little early for the start of major volcanic activity in Tenerife at any rate, for which the Shield-building phase has been dated at about 4-9Ma. On the other hand, one wonders how much is really known about the origins of the Canary Island archipelago, with ocean depths in the area being in the order of 3000m, and only about 5% of the bulk of the islands being sub-aerially exposed.

A band of Earthquake Areas extends along the high ground of the Atlas Mountains and appears to more or less line up with the Volcanic Areas centred on the Canary Islands (*illustration 6*). The volcanic activity has been described in several texts as relating to a 'mantle plume or fixed hotspot', but could the Earthquake Areas in fact all align with a Secondary Plate Margin, and if so , where is it going and when? Eruptions have occurred on Tenerife at approximately 100 year intervals. The last activity was in 1907. The cycle appears more ominous when one learns

Illustration 6: Canary Islands in Relation to the Earth's Active Belts
(adapted from 'Understanding Geology' D. Webster, 2003)



The Earth's Active Belts



Simplified Map of Earth's Plates

that a number of minor earthquakes have been recorded in the past year. Perhaps Old Father Teide, as affectionately referred to by locals, may be now awaking from his period of slumber.

SOME GENERAL INFORMATION

• The Canary Islands (7 in number), spreading over a length of approximately 500km, represent one of the world's major ocean oceanic island groups. The nearest point of land is some 150km from the African mainland.

• Post-erosional volcanic rocks on the Canaries include one of the largest historical lava flows, which formed from 1730 to 1736 in Lanzarote.

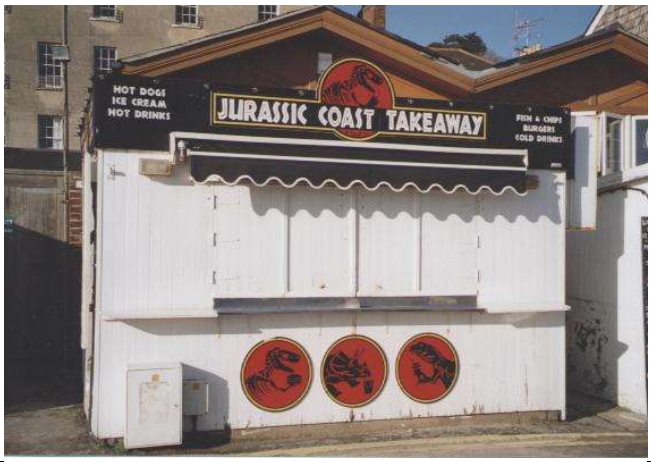
• Tenerife shows at least two phases of sub aerial activity, a shield-building phase (Old Basaltic Series) from about 3.3-8.5Ma and a post-erosional phase starting about 1·9Ma

• The massive Canadas volcano collapsed in about 0.2Ma, to form the Caldera de Las Canadas, which is now some 20k in diameter.

• The soaring stratacones of El Teide and Pico Viejo constitute the major Post-caldera series, which has continued into recent times.

• El Teide, at 3178m, is the highest peak in Spain.

• The last eruption on Tenerife, from a scoria cone on the Western side of the Island, was in 1907, and there was some resulting damage.



JURASSIC COAST

"We are asked not to take anything away from The Jurassic Coast, but just look at this!"

Photograph and caption submitted by John Parkins