



Island Arc Magmatism: Santorini

The Minoan Eruption

Narrator:

So we conjecture that from time to time the cooling magma chamber received a new injection of hot basalt from deep beneath the volcano, and this mixed with andesite to produce some of these layers here within the pile. This state of affairs lasted for about 30,000 years, during which a massive lava cone developed. Then in a mighty explosive eruption, the volcano blew up. The magma chamber emptied. Its roof collapsed, taking with it the central part of the island. The sea came in and large waves, called tsunamis, created widespread havoc and destruction. This event – romantically linked with the destruction of Atlantis – took place about 1500 BC. And while Atlantis remains just a legend, the devastation of settlements on Santorini is not, as excavations in the south have shown. Here are the remains of a Minoan fishing village buried beneath pumice from the eruption.

Dr Richard Thorpe:

... what happened to them. If they had had some warning, it could explain why there are not, so many people were found here. I think it's one of the houses were destroyed by large volcanic blocks which fell in the pyroclastic deposits, so the actual destruction of the town was fairly sudden. Yeah, they're very impressive actually, superb windows and doors. Anyway it looks very interesting over there actually. I think there's a tremendous section here actually because you can see the full thickness of the volcanic units in relation to the size of the houses.

Dr Steve Blake:

Hmm, must be about four or five metres thick, and there are two layers as well.

Dr Richard Thorpe:

Yes, I presume the two layers formed in slightly different ways, but there are some other sections here...

Dr Steve Blake:

Okay.

Narrator:

The pumice layers exposed at the Akrotiri excavations begin to define the sequence of volcanic events of the Minoan eruption. Pumice is widely used for a variety of products, including cement. So much so that huge quantities have been quarried on Santorini and exported to boost the island's economy.

Dr Richard Thorpe:

Sections in the Fira quarries exposed the volcanic products of the Minoan eruption. At the base of the quarry face are some brown, grey, well-bedded, volcanic materials. These are, in fact, older erupted products. They are older than the Minoan eruption; they don't really concern us here. The lowest unit of the Minoan eruption is a massive well-sorted bed about four or five metres in thickness. It has the same characteristics as airfall deposits, so we think it's a basal airfall unit. Above that unit there's a thinner unit, about two or three metres in thickness, which is characterised by small-scale stratification. There are various erosive features; we can see channelling, dune-like forms, and we deduce that this bed was formed by some sort of pyroclastic flow. It is, in fact, a surge deposit. Above that deposit the rest of the quarry face is composed of massive, poorly-sorted units. They are clearly pyroclastic in origin and they're distinguished from the older units of the Minoan by containing large lithic blocks, so we think that those are the product of a different type of pyroclastic flow. They are

different in origin to the surge units we've seen, and they might have been deposited from either ignimbrite or a lahar.

Narrator:

The origin of the car-sized blocks of black lava is also rather enigmatic, and some geologists refer to this layer as the 'problematic beds'. Nearby some of the stratification is disrupted by dramatic impact structures. This block must have left the vent on a ballistic trajectory coming in from the left. Quarrying has stripped off the Minoan cover to such an extent that there is great concern for the preservation of the island, and there is much heated contention about the further exploitation of the pumice. We have only seen part of the Minoan sequence exposed in quarries at Fira.