

HOLIDAY GEOLOGY

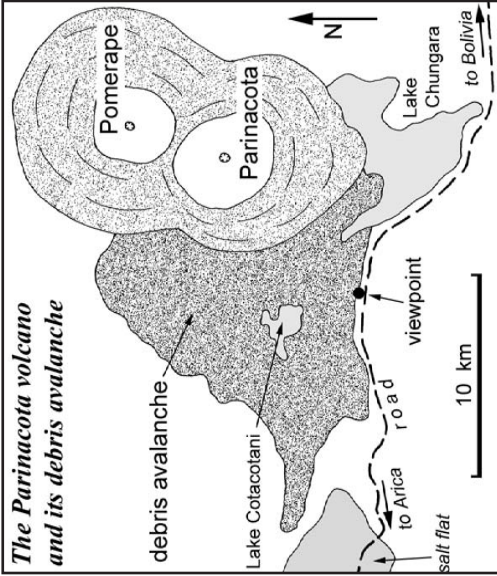
Parinacota, Chile

Where the crest of the High Andes is sandwiched between the altiplano and the Atacama Desert, travellers have a plethora of geological splendours that are beautifully exposed with little or none of the vegetation that is such an inconvenience in regions of more temperate climate. One of the many highlights is the Parque Nacional Lauca in the northern tip of Chile - where Parinacota and Pomerape are lovely volcanic cones astride the Bolivian frontier. And Parinacota is worth the entire journey, just to see its debris avalanche.

Until 1980, the scale, processes and significance of lateral collapses of andesitic and dacitic volcanoes had not been widely appreciated. But then Mt St Helens erupted, and the full story of the flank collapse, the debris avalanche and the lateral blast was revealed. The same had happened on Bezymianny just 24 years previously, but nobody saw much of that in the remote wilderness of Kamchatka. But then prehistoric debris avalanches were recognised below explosive volcanoes all over the world, and the process was seen as a recurring and major feature in volcano evolution.

Parinacota has one of the finest debris avalanches anywhere. It is a beautiful volcano with a snow-capped cone that rises to 6348 m. But the entire cone, that stands 1700 m above the surrounding highlands, is Holocene. An even larger predecessor on the same spot collapsed about 8000 years ago. Its western side failed completely - to produce a massive debris avalanche that swept down and away to the west. Over 6 km³ of rock debris were spread out over 156 km² of land, with a maximum run-out of 23 km. The head-scar of this giant landslide is buried beneath the later volcanic cone, but the debris is hugely impressive. Within it, hills up to 400 m across and 80 m high are single blocks of rock that came off the original volcanic edifice. The rest is a chaos of rubble - that the guidebooks describe merely as lava rubble; it may be all lava and tephra, but the best thing about it is how it got there in a truly fantastic landslide event. When the huge debris slide filled a valley, the shimmering Chungara Lake was impounded just to the south. Its waters still filter out through the permeable debris, on their way feeding the Lakes of Cotacotani stranded in hollows in the centre of the debris.

There are a host of flank-collapse debris avalanches spread below the Andean volcanoes. The largest is beneath Sotocompa, and this extends to over 600 km², but it lies on a remote section of the Chile-Argentina border.



Parinacota is smaller, but it is so very accessible - right beside the main road from Arica to La Paz. The view from that road (the panoramic photograph below) is awe-inspiring. Every feature of a giant debris avalanche that you could ever hope to see is laid out in front of you. This is geology big-time. So call by the lovely coastal town of Arica, rent a car, drive inland through the incredibly barren Atacama, and just go for Parinacota - or stay overnight in Putre, and view the volcano and its splendid debris in early morning light.

Tony Waltham

