

Where do we get the iodine to iodize salt? The ,white gold‘ of the Atacama Desert

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Most of the iodine used to iodize salt worldwide originates in the driest, highest desert on Earth, Chile’s Atacama Desert. It holds the world’s richest iodine and nitrate deposits. However, the source of the massive mineral drifts has long remained a mystery.

Glowing white as they bake on the desert surface, the Atacama mineral belt is 700 kilometers long and 20 km wide. The iodine is either in crunchy surface deposits called caliche — crusts formed by evaporation — or found in veins in bedrock.

„These are weird deposits that, from a geological perspective, shouldn’t be there,“ said Martin Reich, a geochemist at the Universidad de Chile in Santiago. Now, Reich and an international group of collaborators think they’ve finally solved the mystery. Their findings were published in the January 2014 issue of the journal *Geology*.

For decades, the simple explanation was that millions of years of evaporation concentrated the iodine near the desert surface. The minerals were brought in as sea spray carried on fog, or as rain during short-lived climate shifts to wetter periods. But Reich and his colleagues discovered a more complicated story.

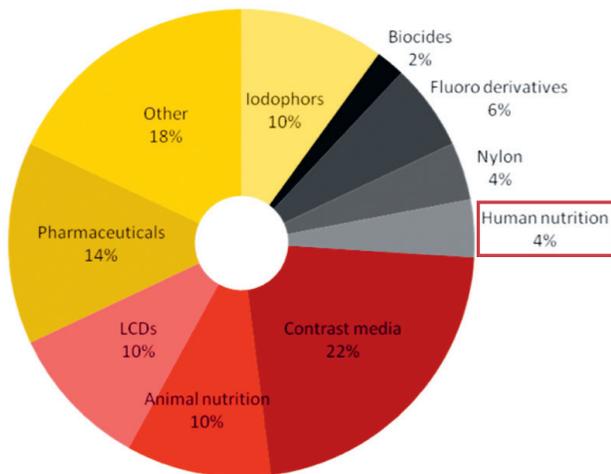
It turns out that the iodine comes from an unusual source — deep, old groundwater. „Our results show the iodine does not come from the atmosphere, such as ocean fog or sea spray, but is very old in age and has been leached and transported from marine sedimentary rocks,“ Reich said.

The first step started more than 20 millions years ago, when rain and snow leached iodine from marine and volcanic rocks in the High Andes. The iodine was transported westward into the future Atacama Desert basin by groundwater.

But the climate shifted and rainfall in the Atacama Desert dropped precipitously. And the Coast Mountain Ranges acted as an impermeable barrier, forcing groundwater to rise and evaporate, leaving behind the iodine and other minerals. This fortunate series of events millions of years ago led to the ‘white gold’ iodine deposits of the Atacama, creating a major source of iodine that today supports the global effort to control iodine deficiency.



Satellite view of the Atacama desert in Chile (above) and a close up of the iodine-rich caliche deposits (bottom)



Only a small fraction of the iodine mined from the Atacama is used for iodized salt

