

Caldera Encyclopedia Article

Caldera

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Caldera

A caldera is a large, usually circular depression at the summit of a **volcano**. Most calderas are formed by subsidence or sinking of the central part of the volcano; a rare few are excavated by violent explosions.

Craters and calderas are distinct structures. Both are circular depressions at the tops of volcanoes, but a crater is much smaller than a caldera and is formed by the building up of material around a vent rather than by the subsidence of material below a cone.

A volcano's summit may subside in two ways. First, eruptions of large volumes of **pumice** or **magma**, or subterranean drainage of the latter to other areas, may empty a chamber beneath the volcano into which a portion of the cone collapses. Second, the summit of the volcano may act as a thin roof over a large **magma chamber** that breaks under its own weight and sinks, partly or wholly, into the magma beneath. The term cauldron is sometimes reserved for calderas formed by the foundering of a cone summit in underlying magma.

The largest volcanic structures in the world are resurgent calderas. Resurgent calderas form following intense **volcanic eruptions** comparable in violence to asteroid impacts. (None has occurred during historical times.) During such an eruption, vast ejections of volcanic material—in some cases, thousands of cubic miles of pumice and ash—excavate very wide underground chambers, much wider than the volcano itself. Large calderas, up to hundreds of square miles in extent, collapse into these chambers. After settling, the caldera floor resurges or bulges up again, lifted by the refilling magma chamber below. Is in the case of the 22 mile (35 km) wide Cerro Galan caldera in Argentina, which is visible as a whole only from orbit, resurgence has raised the center of the caldera to almost a mile (1500 m) above the point of lowest subsidence.

Caldera complexes—overlapping calderas, some swallowing parts of others—are sometimes formed by repeated episodes of partial subsidence. Calderas and caldera complexes are common not only on Earth but on other bodies in the **Solar System** where volcanoes have erupted in the past or are presently erupting, including Mars, Venus, and Io.

See Also

Silicic