Evidence for high volatile contents in andesite and even more acid magmas is the explosive character of eruption. Effusive acid magmas containing aqueous minerals are of special interest. Quizapu cone on the slope of Cerro-Azul volcano (Chile) is such an example.

Description of the volcanic activity according to [Hildreth W. and Drake R.E. Volcan Quizapu, Chilean Andes. Bull Volcanol, 1992], the cone formation is associated with two huge eruptions. The first eruption was in 1846-47. Except for the very short initial stage this eruption was mostly effusive. The volcano was then quiet for several decades. Eruptive activity of variable intensity took place from 1907 until 1932. In 1932, a catastrophic explosive eruption occurred. Five and 4 km$^3$ of hornblende dacite magma was erupted during the Quizapu eruptions in 1846 and 1932, respectively. The magmas are almost identical in mineralogy, chemistry, geochemistry and isotopes. A specific feature of the 1932 eruption is the extremely diversity of product compositions which range from basalt to rhyodacite with 95 % of dacitic composition. Definitely, both magmas were erupted from the same chamber. At the same time, the first eruption was effusive, and the second was explosive, plinian.

Puzzle of Quizapu. In connection with Quizapu eruptions a number of questions emerge, as Hildreth and Drake point out. The lavas from 1846 were the first in the Cerro Azul volcano to contain hornblende (Hb). The fresh Hb in the dacites of these eruptions indicates that the pre-eruption melts contained at least about 4-5 wt.% water. During the ascent to the surface the magma unavoidably degases and Hb breaks down. Since the opacite rims around Hb in the 1846 lavas are not observed, the duration of the ascent and degassing was probably no more than several days [Rutherford, Hill, 1993]. The water content in dacites is only 0.1-0.3 wt.%. Therefore, no less than 500 million tons of water was separated from the magma. Neither fumarole activity nor hot sources were noticed in this region. Thus, the effusive character of the first eruption supposes pre-eruptive degassing of the magma. In contrast, the dacite magma from 1932 underwent intensive surface degassing, which was reflected in the explosive plinian eruption. In both cases the initial water content in the melts was high enough for catastrophically explosive eruption, but in the first case the volatile loss took place in absolutely different way – at depth.

Model of deep degassing. In our opinion, the «Quizapu mystery» can be explained by magmatic chambers at various depths, the dacite chamber being the deeper one, whereas the basic chamber was closer to the surface. The complex structure of the Cerro Azul-Quizapu feeding zone is supported by polymodal composition of the eruptive rocks. The chamber depth where the Hb-dacites formed is more than 5 km. The upper chamber is at the depth of first kilometers where amphibole is unstable at any temperatures and water concentrations. According to the thermodynamic equilibrium law, the water concentration should decrease with depth in the vertically elongated chamber and its contents should be substantially lower than that based on the solubility curve. Water concentration decreases with depth and the difference between the water solubility and the water equilibrium concentration increases. Thus, magma in the chamber excluding its roof, where crystallization occurs, is undersaturated in volatiles. Inflow of the actively degassing dacitic magma to the lower levels of the upper chamber must be accompanied by water dissolution in the basic magma. Thus, the upper chamber will be such a «trap» of volatiles. The basic and the acid magmas cannot be efficiently mixed due to the big difference in their viscosities, and the acid magma of lower density shall emerge through the basalt one. At the depths of the upper chamber, this process is avalanche-like due to the sharp increase of the volatile volume. The magma mostly emerged through the liquid basalt magma, but not along a narrow channel, which caused its faster approach to the surface and perfect Hb preservation. After the eruption the amount of water dissolved in melt significantly exceeded its equilibrium...
content. This excess water was a potential trigger of the moderate explosive activity observed in 1907-1931. The water drop could happen only by diffusion. Due to its low rate, the explosive process was not immediate but was extended in time. Time for significant excess water drop by diffusion was probably not enough. In 1932 the basalt chamber could accumulate the volatiles exsolved from the dacite magma in sufficient extent, and the last eruption was plinian.

Conclusions. The observed facts of the Quizapu volcanic activity can be explained by the occurrence of the two magma chambers, the acidic magma being deeper than the basic one. The vertical distribution of volatiles causes the upper magma chamber to trap volatiles exsolved from the inflowing deeper magma. Such a model of deep degassing explains effusive eruptions of the initially water rich, acidic magmas.