STRUCTURAL POSITION OF THE QUATERNARY CALDERAS IN KAMCHATKA

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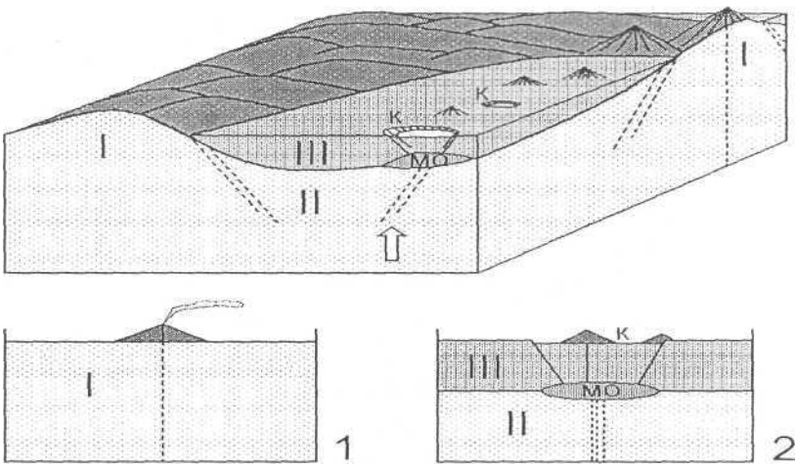
We have analyzed structural position of the Quaternary calderas in Kamchatka, considered their relationships with deep depressions in the basement, and significance of the sedimentary-volcanic cover properties for the emergence of calderas. We conclude that: 1) in Kamchatka, calderas are located in places where volcanic belts are superimposed on the deep depressions in the basement; 2) calderas are confined to the faults bounding these depressions, mostly to those, which form south-eastern boundaries; 3) presence of relatively low-permeable sediments favour magma accumulation and formation of the shallow magma chambers.

Unfavourable for caldera formation are the zones where volcanic belts cross the uplifts and where sedimentary-volcanic cover is lacking. Examples include zones where Eastern volcanic belt crosses Nachiki folded block or Eastern Kamchatka anticlinorium, and most of the Sredinny Range volcanic belt, where it is superimposed on the Kamchatka-Koryak anticlinorium. Although these zones may host volcanoes (e.g. Viliuchinsky and Kizimen in the Eastern Kamchatka or Alney-Chashakondzha and other volcanoes in the Northern part of the Sredinny Range), no calderas have been formed there.



This figure demonstrates the conditions, which favour the formation of the shallow magma chambers and related calderas in Kamchatka. Magma ascends along the permeable zones in the basement and encounters sedimentary-volcanic cover, which works as a sort of screen. Magma accumulates at the base of this cover or even deeper, near the boundary of the Cretaceous and crystallic basement and forms magmatic chambers. If overlying cover hosts any permeable zones, calderas are formed above these chambers. Based on their diameter. Kamchatka calderas can be subdivided into two groups: 3-5 and 9-10 km. We think that this can be related to the two different depth levels of the magmatic chambers. These levels are confined, respectively, to the boundary between sedimentary-volcanic cover and Creataceous basement, and to boundary of the Creataceous and crystallic basement.