VOLCANIC HISTORY OF THE DOUPOVSKÉ HORY VOLCANIC COMPLEX: AN OVERVIEW

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Introduction: The Doupovské hory Volcanic Complex represents the larger and, due to restricted access, also the more enigmatic of two major volcanic complexes within the Eger Rift. As the Basalt2017 meeting is organized on the foothills of this spectacular volcanic area in Central Europe, we bring here a brief summary of volcanic evolution of this complex.

Results: According to earlier interpretations, Doupovské hory Mts. represent an erosional remnant of a single stratovolcano [1]. Re-interpretation of some key profiles [2] provided evidence for lavas prevailing over pyroclastics and more complex evolution of the Doupovské hory Volcanic Complex (DHVC).

The oldest volcanic rocks of the DHVC are exposed on its SE margin, where up to 80 m thick sequences of pyroclastic deposits crop out. These deposits were dated to the Lowermost Oligocene using assemblages of mammal fauna (mammal zone MP21 [3], ca 34 Ma). In these pyroclastic deposits, thicknesses and grain-size of individual beds in lateral sections change rapidly and most likely represent deposits of a condensed volcanic field with several monogenetic volcanoes close to each other.

The early pyroclastic deposits were rapidly covered by thick accumulation (up to 600 m) of mainly basanitic and ankaramitic lavas forming a large shield volcano. The formation of the shield volcano (33–30 Ma) culminated with emplacement of an intrusive complex into the main feeding conduit (30–29 Ma [4]). The Doupov Intrusive Complex comprises two suites of subvolcanic rocks. The volatile-free suite consists of melteigite-ijolite-urtite-peralkaline phonolite differentiation trend, characterized by isotopically (Sr–Nd) more depleted source signature and the absence of volatile-bearing minerals. In contrast, the volatile-rich suite comprises essexite-foid monzonite-foid syenite differentiation trend, characterized by more enriched source signature and the abundance of amphibole and/or phlogopite phenocrysts.

The main shield volcano experienced several periods of edifice decay producing voluminous lahar and debris avalanche deposits. Fans of lahar and debris avalanche deposits are preserved to the north, east, south and also west of the shield volcano remnant.

The oldest sector collapse most probably occurred on the northern side. Remnants of debris avalanche deposits can be observed around Klášterec nad Ohří, and the associated lahar deposits in Kadaň contain frequent petrified tree-trunks [5]. The lahar deposits in Kadaň are overlain by a sequence of lavas (28–22 Ma; [2]) from a younger and smaller shield volcano, which filled up the open space after the sector collapse.

Up to 200 m thick sequence of lahars on the eastern foothills of the Doupovské hory Mts. resulted from sector spreading between Liboc and Střezov Faults. Individual lahar beds have thickness of 1–1.5 m and locally are interbedded with lavas of trachybasalt to trachyandesite composition dated to ~25 Ma.

Another large fan of debris avalanche deposits, locally with lateral transition to lahar (probably due to increasing water content during the movement) has been documented on the southern periphery. These lahars are overlain by a lava flow dated at 20 Ma [6]. The exact age of this slope failure remains unclear, although preliminary data from some lavas embedded in these lahars indicate a Late Miocene ages.

Similarly, little is known about the edifice failure on the western side of the Doupovské hory Mts. In lahar deposits near Karlovy Vary, tunnels and tubes after tree-trunks were thought to represent homes of dwarfs.

The shield volcano of the Doupovské hory Mts. was continuously growing, filling up the spaces opened by sector spreading or sector collapse by new batches of lavas. However, the activity started to decrease during terminal stages of the Lower Miocene, and moved northwards, where several scoria cones with lavas erupted at around 20 Ma [5].

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