FIELD, MEGA AND MICROSCOPIC DESCRIPTION OF THE SUCCESSIVE RHYOLITIC FLOWS IN THE AREA BETWEEN WADI HALWATE AND WADI RANIYAH, ABLAH DISTRICT, ASSIR TERRAIN, WEST CENTRAL ARABIAN SHIELD, SAUDI ARABIA

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Abstract

The study area is located in Ablah area, southwestern part of Arabian shield to the west of the asphaltic Road between Al Jawah in the north and Bani Kabir to the southwest of wadi Raniyah. The present study aims to give a detailed field, mega and microscopic description of the different types of rhyolites in the study area. These rhyolitic flows terminate successive volcano-sedimentary cycles. These cycles begin by tuffaceous green and red mudstone and siltstones that grades upward into rhyolitic tuffaceous sandstone intercalated with pink rhyolitic flows. The cycles are almost terminated by characteristic thick black columnar jointed rhyolite. The present field, mega- and microscopic observations confirm the presence of rhyolite in two main horizons, i.e. first (lower) and second (upper) rhyolite horizons.

The first rhyolite horizon demarcates the eastern scarp of wadi Halwate just overlying the yellow dolostones of the middle part of this scarp. The rhyolite horizon terminates the very thick red, green volcaniclastics and dolostone cycles in which wadi Halwwate is present. The second rhyolite horizon is overlying the first horizon. It terminates the volcaniclastic cycle that formed post the volcanic eruptions of the first rhyolite horizon. This cycle begins by the deposition of thick red hematitic tuffaceous mudstones and siltstones which followed upward by rhyolitic tuffaceous sandstone and terminated by rhyolite.

The study revealed the presence of four main types of rhyolite in the studied rhyolite horizon, these are: Red hematitic rhyolite, spherulitic rhyolite, spherulitic rhyolite of graphic texture and hematitic spherulitic rhyolite of graphic texture. These rhyolite types are arranged from base to top in the studied interval and are just overlying red hematitic sandstones. The first type of rhyolite (red hematitic rhyolite) is rich in K-feldspars while the other types of rhyolite are poor in K-feldspars and rich in quartz and slightly hematitic. The petrographic and geochemical variations depend mainly on the variation in the depositional parameters that predominated during the acidic volcanic eruption (water depth, waves and current activities, amount of rhyolitic tuffaceous ashes and physiochemical parameters). All of these factors effect on the alteration and dilution of the deposited tuffaceous materials and the formation of the different subtypes of rhyolites of the second horizons. The mineralogical composition and textural parameters in the described rhyolite are controlled by the following processes: dilution, devitrification, calcitization, chloritization and hematitization.
References


