

# Characterization of Xeno-pumices from Harrat Rahat, Saudi Arabia: Understanding magma-crust interaction.

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“Xeno-pumice” is a term that has been introduced into the scientific community in the last years. This term describes a pumice-like material that is found as a xenolith in a basaltic rock. A xeno-pumice is an indicator of melt-crust interaction; however, the origin, nature and processes behind this are still under debate. Xeno-pumice have been described in the Canary Islands in Spain [1] and in Indonesia [2]. In this study we will describe, for the first time, the mineralogy, textural features, whole-rock geochemistry (major and trace element) and oxygen isotopes of xeno-pumices found in Harrat Rahat, Saudi Arabia.

Harrat Rahat is a volcanic field, which last eruption was in 1256 A.D., characterized by a wide range of volcanic products: from basalts to trachyte. Previous studies suggested that this chemical variation is given by a difference in the mantle source rather than crustal contamination [3]. However, the xeno-pumices found are an indicator of crust- melt interaction. In this study we will address the crust-melt interaction hypothesis as a process that could be playing an important role in determining the composition of resulting volcanic products. Therefore, the eruptive style of the volcanic field, which is important considering that the last eruption of Harrat Rahat reached the outskirts of the city of Madinah. We analyzed xeno-pumices and host basalts in order to understand melt-crust interaction at Harrat Rahat. The chemistry shows with which type of crust the melt is interacting with (sedimentary, plutonic and/or volcanic) and how crustal interaction influences the melt and its eruptive behavior.

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[2] Gardner, M. F., Troll, V. R., Gamble, J. A., Gertisser, R., Hart, G. L., et al. (2012). Crustal differentiation processes at Krakatau volcano, Indonesia. *Journal of Petrology*, 54(1), 149–182.

[3] Moufti, M., Moghazi, A., Ali, K. (2012). Geochemistry and Sr–Nd–Pb isotopic composition of the Harrat Al-Madinah volcanic field, Saudi Arabia. *Gondwana Research*, 21(2-3), 670–689.