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DYNAMIC PARAMETERS ANALYSIS ON DIFFERENT ERUPTIVE SCENARIOS TROUGH THE SOLAR SYSTEM: A COMPARATIVE PERSPECTIVE

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Volcanism, a major feature of a planet or satellite which is still alive and evolving, is currently known to happen and have happened on different bodies apart from Earth and in many different ways due to differences in planetary conditions. This work, pretends to analyze how the variation of parameters such as gravity and atmosphere, may affect the result of an eruption. In this order, three main scenarios that at a glance resume the volcanism through the Solar System (S.S.), have been identified: Terrestrial Volcanism (especially the explosive case), which is the starting point for this work; extraterrestrial silicate volcanism; and cryovolcanism. Using simulations (analogue and computer based) is pointed out as one of the best methods to obtain models of a possible eruptive result. This models can be compared with real data from the analyzed bodies to have a picture of the influence of the parameters.

The key parameters are gravity and atmospheric density and pressure. Gravity mainly affects the lithostatic gradient, confining pressure, solubility of gases and bubbles nucleation rate, giving different explosive potential for a magma. As showed in Fig. 1, the atmosphere density (ρ_A) is crucial for the formation of an eruptive column and its height. An extra heavy atmosphere can restrict explosive eruptions whereas one so thin may even lead to rarefied gas behavior in eruptive plumes. There's a rich spectrum of combinations of these main parameters in the S.S. and the eruption styles are so diverse. Simple analogue simulations and computer tools are useful to understand the basics, however, to have a more significant answer, robust numerical solutions are needed, like the ASHEE model developed by Cerminara *et al.* (2016). Expanding the use of advanced tools proposed for Earth study to the planetary sciences domain is the next to come for this work.

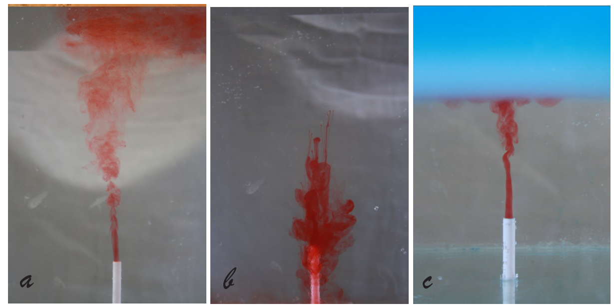

Fig. 1. General role of ρ_A a: highρ (brackish water); b: lowρ (fresh water); c: stratified (fresh water & ethanol). Plume: MEG+EtOH. Based on Woods & Caufield 1992.

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