How powerful can melt inclusions be for the study of Early Cretaceous LIPs?

LUCCHETTI, A.C.F.[1]*, DE CAMPOS, C.P.[1], NARDY, A.J.R.[2], ARIENZO, I.[3], KALIWODA, M.[4], GRIESSHABER, E.[1], SCHMAHL, W.W.[1], JANASI, V.A.[5], DINGWELL, D.B.[1]

[1]Dept. of Earth and Environmental Sc., LMU, Munich, Germany (*correspondence: carolfluch@gmail.com), [2]IGCE, Unesp, Brazil, [3]Vesuvian Observatory, Naples, Italy, [4]Mineralogical State Collection Munich, Munich, Germany, [5]IGc, USP, Brazil

Large igneous provinces (LIPs) result from anomalously high melt production rates. A major key to trace their evolution is the study of melt inclusions (MIs). MI data from some LIPs have already been reported, including the Paraná-Etendeka Magmatic Province (PEMP). However, studies concentrated solely on olivine-hosted MIs in picrites, from the Etendeka side [1; 2]. The PEMP is the second largest with 1,000,000 km^3 most of basalts. Intermediate to silicic products make up 7 and 2.5%, respectively.

This work presents first MI analyses from the silicic volcanism. MIs are hosted in clinopyroxene and plagioclase from a high-Ti trachydacite (Chapecó type). Field and blurred textural data suggest a predominat pyroclastic origin. MIs are partially to completely crystallised and may contain vapor bubbles. Their complexity is enhanced by the advanced Valanginian age. As a consequence, all the groundmass is devitrified. We performed Raman spectroscopy, imaging and EDS by scanning electron microscopy (SEM) and isotopic analyses from separate mineral fractions.

Clinopyroxene-hosted MIs are, by far, more promising. They are less crystallised than those included in the plagioclase, and still contain remaining silicic glass. The mineral phases consist of Fe-Ti oxide, sulphide and pyroxene. Prelimirary analyses from the gas phase reveal the presence of F, Cl, CO_2 and H_2O. Plagioclase-hosted MIs contain pyroxene, plagioclase, alkali-feldspar, quartz, apatite, cristobalite, Fe-Ti oxide and F-Cl-bearing gas bubbles with additional components under study.

$^{87}Sr/^{86}Sr$ data reveal significant isotopic disequilibrium between different mineral phases suggesting physical minggling or separate magmatic reservoirs.

[1] Keiding *et al.* (2011) Geology **39**, 1095-1098. [2] Jennings *et al.* (2017) Geochim. Cosmochim. Ac. **196**, 36-57.