Chemical and mineralogical characterization and rheological constraints on deposition and flux in glassy, highly welded pyroclastic alkaline rhyolites (SW Sardinia, Italy)

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Peralkaline to nearly peralkaline welded pyroclastic rocks usually displays prominent basal vithophiric facies and evidence of early postdepositional rheomorphism. This question, important for correct understanding of these types of pyroclastic volcanic rocks, is poorly constrained in terms of viscosity and evolving of rheomorphism during loss of fluids during cooling. A well-known unit, the Nuraxi formation of Sulcis [1] in SW Sardinia island has been carefully sampled and physically and chemically studied (XRF major element chemistry, EMPA mineral chemistry, TDA-TG, environmental SEM-EDS-FEI, gravimetric density). Also, since devetrification early encompasses cooling (as in the sequence defined in [2]) , XRD mineralogy of matrix was studied. Finally, Hot-Stage Microscopy (HSM) has been used to study the behavior of microcores of rock and synthetic glass cylinders obtained by melting of previously powdered rock. The experimental results have been compared with the theoretical ones defined by the model of [3]. Analyses on dry materials determined that deformation started well over 1100ºC (higher than expected natural temperatures of rhyolitic flows). An amount around 1-2 wt% of water would reduce viscosity under 108 Pa·s inside the 700 - 850ºC range, thus enabling the rhyolitic glass to flow. Also, the macroscopical features of this unit agree with devetrification and chemo-mineralogical patterns.

[1] Gimeno, D. *et al* 2003. *Journal of Non Crystalline Solids*, **323** (**1-3**) pp: 91-96. [2] Gimeno, D. *Journal of Non Crystalline Solids*, **323** (**1-3**) pp: 84-90. [3] Giordano,D. *et al* 2008. *Earth and Planetary Science Letters*, **271**, 121-134.