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Dating of the youngest volcanoes of Ardeche (Massif Central, France) using 40Ar/39Ar and unspiked K/Ar

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Since the first description in 1778 of the relationship between prismatic basaltic flow and volcano in the high valleys of the Ardèche (Faujas Saint-Font, 1778), "L'Ardèche", a small region at the south-west of Massif Central, became worldwide famous among volcanologists. This volcanism is found dispersed over an area of more than 20 km2 and is made of strombolian cones and prismatic flows filling NS to NW-SE valleys. This volcanism has then been considered as one of the most recent one in the entire Massif Central (40 ka to 170 ka, TL ages, Guérin et al., 2007). Unfortunately and despite several attempts over the last 25 years this volcanism has never been dated using radio-isotopic methods. The two main reasons usually advocated to explain this lack of success were the young age of the volcanism itself and the large amounts of mantle and lower crust xenoliths in the lavas (Guérin et al., 2007). In this contribution, we will present combined 40Ar/39Ar ages and unspiked K/Ar results obtained on five lava flows.
The obtained ages range from 26 $\pm$ 5.5 ka to 55 $\pm$ 6.0 ka (1s, full propagated uncertainty relative to ACS-2 at 1.194Ma, Nomade et al., 2005). The ages from three of the investigated lava flows coming from distinct cones, are clustered between 26 $\pm$ 5.5 ka and 34 $\pm$ 4 ka. These cones are found stretched along a NW-SE tectonic accident. These first radio-isotopic constraints prove that the volcanic activity occurred during the last glacial period and is as young as "la chaîne de Puys" located in the northern part of the Massif Central. Incidentally, the volcanic activity is contemporaneous with the first Aurignacian occupation and related art found in the Chauvet cave (37-29 ka, Valladas et al., 2005) localized only 35 km SE. Based on both the spatial and chronological coincidences reported above we suggest that the Aurignacian population(s) that lived in this area have witnessed one or several of these eruptions.