ZONED PSEUDOTACHYLYTES: DO THEY RECORD MULTIPLE EVENTS?

M.A. Laurenzi (1), G. Godard (2), S. Martin (3)
(1) Istituto di Geoscienze e Georisorse, CNR, Pisa (Italy), (2) IPGP, CNRS, Paris 7 (France);
(3) Università dell’Insubria, Como (Italy) (m.laurenzi@igg.cnr.it Fax: +39-050-315-2360)

The dating of pseudotachylyte is becoming very common, and, if successful, it produces a unique age. Many pseudotachylyte veins were sampled along brittle alpine shear zones developed within high grade basement at the hanging wall of the Northern Giudicarie fault (Trentino, NE Italy), in the framework of a detailed field mapping of the area. Pseudotachylyte veins come from sillimanite-bearing gneiss cropping out along the NE-SW trending Rumo fault (Val di Bresimo), and others were found along a minor shear zone related to the main one (Samemberg Alm, Upper Val di Non), in granulite and migmatite. These veins are characterised by thin glass zoning, with layers showing variable clast contents and different colours, often coupled with chemical variations. Whole veins are likely derived from the wall rock, but mass balance studies, using the least-square method, have shown that some quartz is missing in the veins (i.e. 1 rock = a vein + b quartz, with a ranging from 0.9 to 0.7). This can be explained by (i) extraction of clasts (quartz-rich) by gravity, and/or (ii) incipient melt of the host rock.

Thick polished sections were analysed by $^{40}$Ar/$^{39}$Ar laser-probe in-situ dating, with the aim to obtain and compare data from different glass layers within veins. Glassy layers at the boundary with wall rocks display generally ages older than those obtained on the rest of the vein. In one case, Val di Bresimo sample, two glass zones with different colour but rather similar chemical composition, gave an equal apparent ages interval, but displayed different atmospheric $^{40}$Ar content. A third layer, characterised by a slightly different chemical composition and a major clast contents, shows a wider age distribution, but within the same age limits. An age of about 29 Ma could be inferred from all the data set. The three main glass types of Samemberg Alm pseudotachylyte samples, on the contrary, are characterised by chemical differences and show
another age pattern. The K-poor, clast-rich grey glass records relatively younger values, around 20 Ma, and a more K-rich, more homogeneous reddish glass, has slightly older apparent ages, while the most K-rich brown glass shows ages around 28-29 Ma. All points are extremely radiogenic, and form tight clusters on an isochron plot, making uncertain that age calculation approach and leaving open the question on the true meaning of younger ages.