



Evidence for a ca. 1600 Ma lower crust in the Ivrea-Verbano Zone, Italy

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The Ivrea-Verbano Zone (IVZ) is interpreted as being a slice of the South-Alpine lower crust intruded by mantle magmas. Rocks of this zone have been grouped in two major units, the high-grade paragneiss Kinzigite Formation and the voluminous composite Mafic Complex (=Mafic Formation). For the main intrusive body of the Mafic Complex in the Val Sessera and Val Sesia sections, an intrusion age of 288 ± 4 Ma is postulated [1]. This speaks in favour of a short, discrete main underplating event in the Lower Permian. In addition, the age data indicate that a significant thermal event affected the country rock of the Mafic Complex around 310 Ma, the significance of which is not yet clear. This thermal event seems “stratigraphically” to be most prominent in the lower most parts of the crust. We have investigated the area of Monte Capio and Campello Monti (uppermost Val Strona). Here the Mafic Complex forms a composite intrusion which only in parts can be paralleled with the main intrusive body in the Val Sesia. Especially an amphibole-garnet-bearing gabbro strongly resembles the amphibole-gabbro of the lower mafic complex in the Val Sessera [1]. From this a zircon U-Pb intrusion age of $323,6 \pm 7.7$ Ma could be determined confirming the Carboniferous thermal event found in the Val Sesia-Sessera sections [2]. On the other hand, we have also investigated zircons from cumulitic pyroxene-gabbros and norites belonging to the mafic-ultramafic complex of Campello Monti. The U-Pb intrusion age of the pyroxene-gabbro is 1593 ± 23 Ma, whereas a corresponding zircon age of 941 ± 28 Ma is found for the norites. Both rocks constitute the oldest rocks found so far in the IVZ and the Southern Alps.

These new ages are the first unequivocal evidence that older magmatic events than

Upper Palaeozoic-Permian can be detected in the lower parts of the IVZ. This further substantiates that magmatic underplating events forming the lower crust in the IVZ have been active for ca. 1300 Ma, comprising a number of discrete intrusive phases of only a few million years duration.

References: [1] Peressini et al., 2007, *J. Petrology*, 48/6, 1185-1218

[2] Abstract Goldschmidt 2007