HIRSIGER Caroline (2015): Characterization and datation of magmatism in the area of Fusio, north Val Maggia, Tessin

ABSTRACT

The Alpigia intrusion situated at the intersection of Antigorio, Sambuco, Campo Tencia(-Simano) and Maggia in Tessin, southern Swiss Alps is in the heart of many controversies. Indeed there is no general agreement on the continuity of Sambuco and Maggia and on the belonging of Alpigia to Antigorio, as originally mapped or to Sambuco, making the link between the latter and Maggia.

This project provides new petrological and geochemical data and ages. The Alpigia complex is constituted of different facies from cumulative hornblendite to highly differentiated leucogranite. Three of these facies of Alpigia have been dated by U-Pb zircon technique with the LA-ICP-MS. The calc-alkaline Alpigia pluton yielded ages of 292.8 ± 2 Ma for a gabbro, 293.90 ± 1.20 Ma for a tonalite and 288.70 ± 3.40 Ma for a leucogranite leading to the conclusion that this pluton was emplaced in a short time. Variscan ages are similar to those of the neighbouring nappes of the Helvetic (Gotthard and other External Crystalline Massifs) and Lower Penninic domains (Monte Leone, Sambuco, Maggia, Verampio) especially Antigorio that includes three granitoid intrusions dated between 289 and 296 ± 2 Ma. These contemporaneous ages of Alpigia and Antigorio suggest clearly that Alpigia is definitely part of Antigorio, even if the hypothesis of the belonging of Alpigia to Sambuco (-Maggia) cannot be excluded.

Amphibolites associated with leucocratic rocks were intruded by the Alpigia pluton. These rocks were investigated too. Amphibolites and leucocratic rocks are comagmatic however their genetic link cannot be demonstrated. The preferred assumption is nonetheless that the leucocratic rocks are the result of amphibole fractionnation. These associated leucocratic rocks were dated as well and yielded ages of 476.3 ± 5.2 Ma and 464 ± 4.05 Ma. These Ordovician ages as well as their tholeiitic affinity and completely distinct geochemistry confirm the completely different emplacement setting than those of the Alpigia intrusion. These amphibolites can possibly be localized small flood basalts from back-arc extensional basins, even if no affirmations can be done without more analyses.

An augengneiss from Sambuco was analyzed and dated too. It has an age of 451.80 ± 2.8 Ma. This age is Ordovician, as the amphibolites and associated leucocratic rocks. However this orthogneiss is a calc-alkaline granite. These calc-alkaline intrusions, so-called "older orthogneisses", are well documented in the Alpine literature. They are widespread in basement units of all paleogeographic domains suggesting a wide orogeny.