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Iron Chemical Analysis of Spodosols to Date Last Pleistocene-Holocene. The Example of the Italian Central Alps.

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The deglaciation of the Italian Central Alps is still discussed and not well known, especially when we consider the Late Pleistocene-Early Holocene. This study will use different fraction of the iron content of paleo-spodosols to date the time of the deglaciation of three areas in the Central Italian Alps (Gavia, Stelvio and Val Viola). Relying on a first soil distribution analysis and on geomorphological evidences, we opened and described 24 soil pits and from each A and B horizon we collected at least 1 kg of sample to do some basic soil physical analysis: granulometry, water content, pH and loss on ignition. The oxalate extractable iron fraction and the dithionite extractable iron fraction have been determined with standard lab procedures, the total iron content has been determined using a SEM/EDX analysis. We calculated the Iron Crystallinity Ratio, defined as the difference between the dithionite extractable iron fraction and the oxalate extractable iron fraction, normalized on the total iron content. The Iron Crystallinity Ratio gives us a relative age of the soil formation: using data from radiocarbon dating and from cosmogenic dating, we calibrated the Iron Crystallinity Ratio with absolute ages. With the obtained functions, which showed a good fitting, we calculated ages between 15809 years and 5490 years in the Gavia area, between 11760 years and 7237 years in the Stelvio area and between 14668 years and 7096 years in the Val Viola area.