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# Integration of natural data within a numerical model of ablative subduction: A possible interpretation for the Alpine dynamics of the Austroalpine crust.

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A numerical modelling approach is used to validate the physical and geological reliability of the ablative subduction mechanism during Alpine convergence in order to interpret the tectonic and metamorphic evolution of an inner portion of the Alpine belt: the Austroalpine Domain. The model predictions and the natural data for the Austroalpine of the Western Alps agree very well in terms of P-T peak conditions, relative chronology of peak and exhumation events, P-T-t paths, thermal gradients and the tectonic evolution of the continental rocks. These findings suggest that a pre-collisional evolution of this domain, with the burial of the continental rocks (induced by ablative subduction of the overriding Adria plate) and their exhumation (driven by an upwelling flow generated in a hydrated mantle wedge) could be a valid mechanism that reproduces the actual tectono-metamorphic configuration of this part of the Alps. There is less agreement between the model predictions and the natural data for the Austroalpine of the Central-Eastern Alps. Based on the natural data available in the literature, a critical discussion of the other proposed mechanisms is presented, and additional geological factors that should be considered within the numerical model are suggested to improve the fitting to the numerical results; these factors include variations in the continental and/or oceanic thickness, variation of the subduction rate and/or slab dip, the initial thermal state of the passive margin, the occurrence of continental collision and an oblique convergence.