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Accretion of continental nappes along a convergent plate boundary

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Since the late Mesozoic, the convergence between the African and Eurasian plates has been accompanied by the accretion along the western Tethys suture of oceanic and continental material (blocks, nappes) separated by north-dipping thrusts. The fully coupled thermo-mechanical numerical code PARAVOZ is used to perform a parametric study on an oceanic subduction zone undergoing the arrival of one or two micro-continents to the subduction-zone continental margin. The lithosphere of the incoming continent is modelled as having a crust that is thicker and less dense, compared to the subducting oceanic crust around it. A wide range of parameters including slab pull magnitude, temperature distribution, initial geometry of the subduction zone and rheology, is explored to understand the dynamics of accretion, the deformation of the slab and the possible consequences for the deformation of the overriding plate. The first results show that the progressive incorporation of a continental block at the continental margin has a distinct expression of the dynamics of subduction. Initially, most of the deformation is localized in the suture zone forming a shear band that extends from the surface down along the subduction interface. When the continent reaches the trench, a second, shallow-angle, major shear band develops. It extends from the Moho of the incoming continental block downwards and in the direction of subduction and connects to the first suture at depth. In the course of the progressive incorporation of the nappe, this shear zone becomes steeper, while the deformation within the first su-

ture gradually ceases. By the time the emplacement of the nappe into the continental margin is completed, this new major shear zone, by now reaching the surface, takes over completely as the single active suture zone. Following the same process, a second micro-continent will take part in the continuing accretion process.